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The Jackson Lecture.[1]

HOSPITALS: AN HISTORICAL SURVEY.

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IT is a special privilege for a hospital superintendent—a role which Dr. Sandford Jackson filled so successfully—to be asked to give the annual lecture in his honour. Unlike most of you, who must remember hearing his voice in this very room, I did not know Jackson personally. Nevertheless, I think that the subject of tonight's lecture is one which he himself would have treated admirably, so well versed was he in medical history and so well acquainted with hospitals and their ways.

This paper is in three parts. The first provides glimpses of the primitive hospitals of the past; the second part traces the evolution of the great institutions of the present day; and the third endeavours to lift a corner of the curtain that conceals the future.

PART I.

Priests and Physicians.

Our historical record begins with Imhōtep, a priest and physician of Ancient Egypt, who lived about the year 3000 B.C. As a physician he founded an art of medicine based upon considerable knowledge of anatomy and physiology and of the properties of drugs. But he was a priest as well, and it was to the temples that the sick came for his treatment. As the centuries passed Imhōtep's teachings were forgotten, and, though the sick continued to come to the temples, medical knowledge was slowly eclipsed by religious ritual and finally lapsed into stillness.

Meanwhile there had been carved on a great pillar of stone in Babylon the laws of Hammurabi, the Semitic conqueror. From this we know that in Babylon also it was the priests who treated the sick, in the temples of the sun god Shamash. Moreover, special provision was made for the indigent. In a country where usury was universal there was this one exception: the temple priests would advance money to a sick man on the sole condition that if he recovered he would repay; if not there would be no claim against his estate.

It was the Greeks who separated the offices of physician and priest. They inherited from Babylon the practice of treating the sick in the temples, substituting for Shamash their own deity Apollo, until healing came to be the special function of the god Asclepius. Some say the latter was a man; but I like to think, as the Greeks believed, that he was the son of Apollo by the nymph Coronis, and that his education was entrusted to the centaur Chiron, who taught the boy the art of medicine. Be this as it may, Asclepius performed such miracles of healing that it was to his temples thereafter that sick folk came for cure.

The greatest of these was at his birthplace Epidaurus, not far from Athens, where the priest-physicians (now called Asclepiads) established a centre famous throughout Hellas for its success in treating disease. Patients from every part of the Mediterranean world thronged its courts. They slept in the temple, submitted hopefully to the regimen prescribed, and recorded their cures, which they believed to be miraculous, on tablets of stone which to this day lie here and there among the ruins of the sacred grove.

But with the passage of time knowledge increased and credulity declined. People refused to believe in miracles and came to doubt the efficacy of the priestly methods, and

[1] Delivered at a meeting of the Queensland Branch of the British Medical Association on September 5, 1941.

new ways had to be devised to keep the temple coffers full. But the Asclepiads were not unobservant. They had noticed that most patients recovered anyhow and they had long since realized how large a part rest, fresh air and a sensible diet played in the restoration of health. So we find Hippocrates, the greatest of them all, supplanting the temple ritual by the scientific method. Diseases were classified and were no longer regarded as the work of evil spirits but as the logical outcome of disturbed natural processes. Magic was replaced by observation, the priest by the physician.

Treatment centres known as "iatreia" now came into being. We should call them out-patient surgeries. Young physicians who had studied at one of the Asclepian temples settled in the cities and opened these iatreia as annexes to their private homes. We are told that they took gifts from the rich and gave free treatment to the poor. The larger cities had full-time medical officers to do similar work; and they were paid out of public funds.

Nevertheless the temples of Asclepius continued to function as the principal hospitals for the sick, and by the year 300 B.C. they were to be found not only in Greece but along the coast of Asia Minor and in North Africa, at Ephesus, Syracuse, Alexandria and elsewhere. Here, too, were to be found groups of students who had come to listen to the words of the master as he moved among the patients. These were the medical schools of the ancient world.

The Roman Era.

In the year 293 B.C. a severe pestilence struck the city of Rome. Her people died in thousands, despite the efforts of the priests and the sacrifices which burned on every altar. In despair, ambassadors were sent to the temple at Epidaurus, where the Greeks received them kindly, instructing them to build a similar temple at Rome, presenting them with one of the sacred snakes and no doubt adding some advice on the treatment of the disease. On the return of the ambassadors a temple to Asclepius was soon constructed on an island in the Tiber, and as the pestilence shortly abated the Greek God of Medicine became very popular in Rome.

It appears, however, that the priests who were in charge of the temple on Tiber Island had little medical knowledge. Treatment drifted along the old, dreary, theurgical lines and after a time the island was neglected by the Roman citizens, although it continued to be a refuge for sick and worn-out slaves. Singer says that it even became the custom to expose the slaves on this island to save the trouble of treating them. Certainly no active measures were taken to cure them. An indication of the odds against them was the edict of the Emperor Claudius that those slaves who recovered were to go free.

The Roman citizens on the other hand took care to secure the services of physicians who had studied at one of the great medical schools, and when sick they preferred to be nursed in their own homes, or in annexes attached to the physician's house.

A different type of institutional treatment was to be found on the large estates, where the heads of families were in the habit of practising simple medicine and crude surgery upon their households and their slaves. The latter, of course, had a cash value and it was therefore only common sense to safeguard their health. So it came about that "valetudinaria" were established, with the object of maintaining the slaves in a state of fitness for labour. Simple hygienic treatment was given, and intelligent slaves, both male and female, received a rough training and were employed as medical attendants.

The most fortunate sick man in those days was the Roman soldier. Army medicine was of a high standard and the military valetudinaria were admirable. Ruins discovered at Carnuntum, near Vienna, reveal a large building constructed around a central rectangular court, with rooms opening on corridors. There were excellent arrangements for water, kitchen and pharmacies—yet this was on the frontier. From the military valetudinaria it was no great step to the construction of similar institutions for Roman citizens in provincial towns.

In due course the Christian Church took its part in the affairs of the Empire. The care of the sick was then, as now, one of its recognized functions, and the sick poor were tended in Christian valetudinaria. In the year 335 Constantine issued a decree which disestablished the pagan faith and the temples and "asclepiæ" associated with it. The last mentioned had grown in the meantime from small wards attached to the temples until they now had the status of municipal hospitals, staffed by physicians in the public service. Their overthrow was the Church's opportunity. Before the close of the century Saint Fabiola opened at Rome the first Christian hospital in Western Europe, intended (in the words of Saint Jerome) "to gather in the sick from the streets and to nurse the wretched sufferers, wasted with poverty and disease".

The East was already more advanced and some years earlier Saint Basil had founded at Caesarea not merely a hospital, but a community health centre, consisting of a larger number of buildings with houses for physicians and nurses, workshops and industrial schools.

By the year A.D. 500 most of the large towns in the Roman Empire had erected hospitals. But the standards of medicine were falling. Nursing, inspired by religion, was gentle and considerate, but the scientific medical practice of the Greeks had, as it were, been drowned in holy water. The confidence of the patient no longer rested on the skill of his physician, but on the miraculous healing properties of some saintly bones.

The Middle Ages.

Records of hospitals of the succeeding centuries up to the Middle Ages are scarce, and it is probable that there were but few outside the Italian cities. Occasional almshouses in the towns of Europe sheltered some of the sick, and inns along the Roman roads housed others. The flame burnt low, but it was kept alight. As an expression of their belief that the sick man was entitled to God's hospitality, the clergy of Lyons built an Hôtel Dieu in the year 542. This was followed in 660 by the famous Hôtel Dieu of Paris, which has given continuous service since its foundation.

Meanwhile the Church was gradually absorbing the Roman valetudinaria in England, as it had done elsewhere in Europe. In course of time other hospitals were established, but they were ecclesiastical, not medical, institutions. To the monks in attendance the soul, not the body, was of major concern. For the latter they had but food and wine and a few simple herbs. But if these failed, as they did so often, the patient's soul at least was well prepared.

But with all their false emphasis on sin as the cause of disease, it was the religious orders that kept alive, throughout the Dark Ages, such medical knowledge as there was. They also fostered the motive of loving man, however loathsome, for God's sake, and for hundreds of years the infirmaries of Western Europe were attached to the cloisters. Some of these may have been mere barns to shelter diseased beggars, but others were quite elaborate. Saint Gall's Hospital plan, dating from the ninth century, includes surgeries for cupping and bleeding, a room for grave cases, dwelling houses for physicians and a pharmacy.

The ninth century, in fact, saw the beginning of a great hospital movement in Europe. Religious orders were multiplying and, in addition to looking after local sick folk, a number of them created "hospitia" or infirmaries adjacent to the monasteries. These provided food, shelter and medical attention for travellers who through sickness had fallen by the wayside. One of them, the famous Alpine hospice of Saint Bernard, still gives succour to the weary and sends its dogs out into the snow to rescue climbers who are lost.

The shadow of the Dark Ages was lifting. In Western Europe the teachings of the school of Salerno were beginning to be heard. Further East, the Caliphs of Islam, sated with conquest, had turned their attention to science, and there was already an important hospital at Damascus. Even in far-away England a Saxon infirmary had been established at Saint Albans.

With the Crusades the hospital revival grew rapidly, for, in the absence of army hygiene, pestilence proved more dangerous than the swords of the Saracens. As a result military hospital orders sprang up and accommodation for sick and exhausted crusaders was established along all the travelled roads. Crusaders from Amalfi (near Salerno) established the Order of St. John, and erected a splendid building at Jerusalem capable of housing 2,000 patients. It was a curious blend of military fortress, military hospital and monastery, and served all three purposes. Knights of the Order took personal charge of the service to patients and we are told that they often denied themselves that the sick might have food and medical care.

About this time, a man named Rahere, formerly court jester to Henry I of England, had occasion to make a religious pilgrimage to Rome. Falling sick there, he returned to London to fulfil a vow to build a hospital in honour of Saint Bartholomew. This he did in 1137 on a portion of the royal land at Smithfield, and there the hospital still stands, the oldest in Britain. Early records show that it was not simply an alms-house, as were many hospitals of that day, but was well organized under a chief administrator and cared for many types of patient, including women in confinement.

Saint Thomas's Hospital was founded not long afterwards by a woman, later canonized as Saint Mary Overie, with the wealth she had accumulated by operating a ferry over the Thames. The original building disappeared, however, in a great fire which destroyed the whole of Southwark, and a new Saint Thomas's was constructed by the Bishop of Winchester in 1228.

The thirteenth century saw many other large European cities awakening to the needs of their sick poor, as Eastern commerce, flowing into Europe as a result of the Crusades, was increasing national wealth and population. The problem had grown too large for the monasteries to deal with entirely and the hospitals began to pass out of their hands. Pope Innocent III actually set his seal on the new order in 1198, when he formerly approved a hospital built by a layman in honour of the Holy Ghost. Not content with this the Pope himself founded a model hospital in Rome and urged that similar institutions should be erected by the citizens of every important town. Visitors came from all parts of Europe to see the Pope's Hospital (Santo Spirito in Sassia) and returned to their own cities to build. It is estimated that in Germany alone no fewer than 155 towns had Hospitals of the Holy Ghost in early mediæval times.

What were the hospitals of the Middle Ages like? There is abundant information about the Hôtel Dieu of Paris, one of the largest and best. Rebuilt on a new site at the beginning of the thirteenth century, it was provided with four principal halls for patients in various stages of disease, as well as one for convalescents and another for maternity patients. Illustrations by contemporary artists show that two persons generally shared one bed. Heavy curtains sometimes hung from canopies over the bed to afford privacy. Huge fireplaces and charcoal stoves provided warmth in the rooms, and there were plenty of woollen bed coverings, which were needed, as patients were usually unclothed except for linen turbans.

The patient's garments were kept in a locker room, where they were cleaned, mended and returned to him before he left. The hospital had a *blanchissage* or laundry, opening on the Seine, where the sisters washed the linen in the none too clean waters of the river. Hot water was available for the bathing of patients, not for the sake of cleanliness so much as for its supposed therapeutic value.

The organization of services at the Hôtel Dieu was quite elaborate. Each department had a chief. One of the brothers bought food, another was responsible for drugs, a sister was in charge of the laundry and another saw to the making of bandages. The institution was quite self-contained in that it maintained a bakery, a herb garden and a farm.

Sad to say not all the hospitals of the Middle Ages were so well managed. Although attendants were plentiful, beds were scarce, and it was a common practice to crowd, not two, but several patients into the same bed—convalescent, contagious disease and dying together—so that a patient on awakening might find a corpse beside him.

There was little provision for medical or surgical treatment. The Church edict of 1163 forbidding priests to perform operations had thrown surgery into the hands of the ignorant barbers, and medical practice largely consisted of cupping, bleeding and the administration of worthless remedies.

At their best, then, the hospitals of mediæval Europe provided kindly but unskilled attention and gentle nursing for the sick; at their worst they were mere refuges to which the patient came at his peril. In striking contrast was the great Al-Mansur Hospital at Cairo. Erected about 1280, it was a huge quadrangular structure with fountains playing in its four courtyards. There were separate sections for the wounded, for those with fevers and for eye cases, wards for women and convalescents, lecture rooms, an extensive library, out-patient clinics, diet kitchens, an orphan asylum and a mosque. It employed male and female nurses, had a large income, and actually disbursed a suitable sum to each convalescent on his departure so that he might not have to go to work at once. The patients were nourished upon a rich and attractive diet and the sleepers were provided with soft music, or, as in the "Arabian Nights", with accomplished tellers of tales.

Medicine shared in the Revival of Learning in Europe, which followed the fall of Byzantium in 1453, and hospitals at once gained in importance, for they provided clinical material for the new generation of inquiring physicians. This was especially the case in Italy, where organized medicine was ahead of that in other countries. The Italian hospitals were already in the hands of the municipalities, and some magnificent edifices had been built. In England, however, they were still Church property, and the Reformation, therefore, came as a tremendous blow. Undoubtedly the old monastic spirit had degenerated and corruptions had crept in. Kings used to lodge in the hospitals when travelling about the country and they sent their old retainers to end their days in them. Large numbers of vagrants received board and lodging there, thus crowding out the sick. The monks, also, spent the revenues in purchasing relics of the saints to attract the pious instead of using it for their patients.

Henry VIII suppressed monasteries and hospitals alike. Even Saint Bartholomew's and Saint Thomas's were closed, to be reopened some years later as a result of public outcry and a special petition to the King. Conditions throughout the rest of the country were deplorable. Twenty-three of the principal counties had no general hospitals, and for the sick poor the only alternative to being neglected at home was to attempt the long, difficult journey to London in the hope of reaching Saint Bartholomew's or Saint Thomas's. In those vigorous and callous days the sick were generally disregarded. It did not occur to the authorities that illness was a social evil which could be largely rectified. The leaders of the medical world were lost in theories and philosophies, and from their cold learning no warmth was felt by the people at large.

PART II.

Eighteenth and Nineteenth Century Hospitals.

Modern medicine began with Sydenham, who brought physicians back from their theories to clinical observation and personal experience, and who emphasized that the primary object was the cure of the patient. And although it was some time before the benefit of the new outlook on medicine was felt in the wards, the early part of the eighteenth century witnessed a tremendous revival in hospital building. Since the dissolution of the monasteries there had been no provision whatever for institutional treatment of the sick poor, a point completely ignored in the Elizabethan Poor Law. At the royal hospitals, partly to guard against vagrancy and partly to meet expenses (which included a salaried medical staff), prospective patients had either to present a governor's letter or make some payment. At Saint Bartholomew's, patients had to deposit 19s. 6d. as a burial fee, which they could hardly

have had the audacity to reclaim if not required. Many of the poorest, therefore, were unable to gain admission and died outside the gates.

It was to meet this scandal that humanitarian folk built the "voluntary" hospitals on the threefold principle that the poor would be treated free, that the medical staff would give their services without monetary reward, and that the hospital itself would depend entirely upon the charity of the public for its upkeep. One of the first was the Westminster Infirmary (now Hospital) founded in 1720. Not long afterwards, Thomas Guy, a bookseller and publisher, who had done well in South Sea shares, left his entire fortune of more than £200,000 to found the hospital that bears his name. The London Hospital came in 1740 and the Middlesex five years later, and others were founded in the large provincial towns.

Nor was hospital building limited to England. Philadelphia opened a public institution for the aged, infirm and insane in 1732, which gradually extended its scope to become the Philadelphia General Hospital, the oldest in the United States. Meanwhile in Russia Peter the Great was trying to nationalize medicine. As part of the scheme he built a hospital and medical school at St. Petersburg, copying the Greenwich design. Garrison records that "being of wood the structure was often burnt down and as often rebuilt, despite the grumbling of the ecclesiastics, who had to find the funds".

Different motives governed the establishment of the Edinburgh Royal Infirmary. Monro writes that although professorships of anatomy and medicine had been established at the university in 1720, "the plan for a medical education at Edinburgh was still incomplete without a hospital where students could see the practice of physic and surgery". But the sponsors knew their public. Carefully omitting any reference to medical students, subscriptions were called "for building and supporting a hospital for the reception of diseased poor", and the response was fine!

It must be recorded with regret that eighteenth century medicine was unworthy of the generosity of the charitable laymen and municipal authorities who constructed the hospitals. Conditions inside were appalling. Not only was there no attempt at isolating contagious cases from the others, but all the ordinary rules of cleanliness and even common decency were often neglected. Tenon's memoirs, published in 1788, contain a description of the Hôtel Dieu of Paris which contrasts very unfavourably with conditions at the same hospital 300 years earlier.

> There were some 1,220 beds, most of which contained from four to six patients, and also about 486 beds for single patients. The larger halls contained over 800 patients crowded on pallets or lying miserably on heaps of straw, which was in a vile condition. Acute contagious diseases were often in close relation to mild cases, vermin and filth abounded, and the ventilation was often so abominable that the attendants and inspectors would not enter in the morning without a sponge dipped in vinegar held to their faces. Septic fevers and other infections were the rule. The average mortality was about 20% and recovery from surgical operations was a rarity. (Garrison.)

Much the same description could have been applied to other large institutions in the European capitals, and it was not until John Howard had made his exhaustive studies of the condition of European hospitals, prisons and lazarettos, and after Tenon had published his report, that any attempts at reforms were made. Baas says that in some cities "even physicians declined hospital service as equivalent to a sentence of death". Hospitals remained notorious for uncleanliness and general danger to life until well into the nineteenth century. If some folk harbour an illogical prejudice against them today they have inherited this unwelcome legacy from the past.

The surgical wards in particular were atrocious. The surgeons of the day had an excellent knowledge of anatomy and performed more operations than in any previous era. But there was one important difference; whereas the mediæval and ancient surgeons had sought to keep wounds clean, even using wine for the purpose, nineteenth century surgeons believed suppuration to be desirable and encouraged it. Hospital wards were filled with discharging wounds which made the atmosphere intolerably offensive. Surgeons wore their operating coats for months without having them washed, and the same bed-linen served several patients. Pain, hæmorrhage and gangrene were commonplace in the wards.

But there were some who thought differently, even in those days. One such was Edward Alanson, a Liverpool surgeon, who died in 1823, and of whom it is recorded that in his insistence on absolute cleanliness and proper ventilation in his wards he was much ahead of his times. About the same time Nathan Smith, on the other side of the Atlantic, advocated the use of perchloride of mercury solution to reduce infection, but his ideas did not even provoke ridicule; they were simply ignored.

Relief came at last. In 1857 Pasteur presented to the Academy of Sciences his paper on "Alcoholic Fermentation" in which he showed that the process was a vital one and due to invasion by living organisms. In 1860, the year that Pasteur demonstrated bacteria in the air, a young English surgeon named Joseph Lister became Professor of Surgery at Glasgow. Within five years the problem of wound infection had been solved. Meanwhile Morton had introduced ether anæsthesia in Boston and a year later Simpson was using chloroform in Edinburgh. As their ideas were accepted it gradually became the aim of surgeons everywhere to keep their patients free from sepsis and from pain.

Nursing.

It has taken more than modern surgery, however, to make the modern hospital; for above all others it is the nurse who sets the standard of the patient's surroundings.

In the Roman valetudinaria waiting on the sick had been considered a menial task only fit for slaves, but from the time of the first Christian religious orders for women nursing became one of their principal works. In Catholic countries the transition from religious to lay nursing was gradual. For a long time the hospitals depended entirely upon the services of devout women whose glory it was "to labour, and not to look for any reward", but eventually, during the seventeenth century, we hear of peasant girls at the Hôtel Dieu in Paris being taught the essentials of nursing by the nuns.

In Protestant countries the abolition of religious sisterhoods after the Reformation left nursing in the hands of ignorant laywomen, without training and without ideals to guide them. From being a religious vocation, the care of the sick suddenly became one of the lowest female trades. When the London Hospital was opened in 1740 the first nurse to serve there was not graced with the title of "Miss" or "Mrs.", but was known simply by her surname "Squire". She was subsequently found to be taking money from the patients, but was retained on her promise to reform. She was typical of the nurses of that period, women who drank to excess, indulged in petty larceny and maltreated the patients. The hospital authorities were partly to blame for this, because the extremely poor pay and shocking conditions attracted only women of the lowest class.

Conditions at the Radcliffe Infirmary at Oxford in the early part of the nineteenth century reflect those that prevailed elsewhere. The salary of a nurse was £5 a year, and one nurse only was the allowance for a ward of seventeen patients. Her day began at 6 a.m. The wards were cleaned till seven, when a bell was rung and each nurse had to bring down her ashes and sift them under the direction of the porter, who then gave her coals for the day. She took breakfast with the patients, who helped her, so far as they were able, with the ward work. At 2 p.m. she went to the servants' hall, where she had her dinner in company with the servants on daily hire. During dinner the ward was left in charge of a patient. After dinner she took away a plate of meat and vegetables for her supper. For the night there was normally only one nurse for the whole hospital of about 100 beds. Nurses had no regular holidays and were never allowed to leave the hospital before 6 p.m.

As late as 1849 we find this extract from the minutes of a hospital board meeting: "Resolved that an advertisement

shall be inserted in the papers tomorrow, for a nurse who can read and write, or at least read writing . . ." The practice of nurses receiving tips from patients continued until 1870 or even beyond.

But the tide had already began to turn. In the 1830's a German pastor (Theodor Fliedner) had founded an Order of Deaconesses to nurse the sick in his little hospital at Kaiserswerth, which was part of a larger institution caring for orphans and discharged female prisoners. Although they took no vows, the lives of the Kaiserswerth deaconesses were modelled on the Catholic nursing orders, and great emphasis was laid on the fact that nursing was a vocation demanding high qualities in those who followed it. Florence Nightingale, visiting Kaiserswerth in 1850, found there the inspiration that she needed, and next year she was enrolled as a student nurse. Two years later she was able to put her ideas into practice when she became head of an Establishment for Gentlewomen during Illness in Harley Street. But it was not long before she was needed in a more important post. There was war in the Crimea and casualties from cholera, scurvy and cannon were soon enormous. In contrast to the French, who were nursed by Catholic nuns, the British casualties were left to the mercy of army orderlies. Their pitiable condition eventually resulted in Florence Nightingale being sent in charge of a party of nurses to the Scutari Hospital.

She found that just before her arrival:

> a hundred of the wounded had contracted cholera and nothing was being done to prevent the infection from spreading. The blankets and the beds were stiff with dirt and dried blood. One small fountain was the only source of water, so that, even had enough orderlies been on duty to wash the men and their wounds there would not have been enough water to keep them clean. The stench in the wards was stifling; at one time were were only twenty chamber pots for the use of two thousand men . . . The soldiers lay on hard lumpy and dirty pads and suffered terribly from bedsores. There was neither laundry nor hospital clothing and there were not enough bandages. Men were simply allowed to bleed to death. The food, such as it was, consisted entirely of meat. There were no regular hours for meals, and so few knives and forks in the Hospital that most of the men used their hands. (Goldsmith.)

Florence Nightingale's subsequent bitter struggles with the army authorities, her own nurses and not least (I am sorry to say) with the medical staff would take too long to recount. But figures speak. By the spring of 1855, after she had been at Scutari for less than six months, the death rate at the hospital had fallen from 42% to 22 per thousand! It is almost unbelievable.

The culmination of her work came in 1860, after the war was over, when she founded the School for Nursing at Saint Thomas's Hospital, directing its activities, not as matron, but from an invalid's couch in her London home. It was the year that Lister went to Glasgow. For us it also marks the birth of Dr. Sandford Jackson. Twenty-five years later, following in Florence Nightingale's footsteps, and profiting by the impetus she had given to nursing, he was to found the Training School for Nurses at the Brisbane Hospital.

The whole status of nursing was changed by that great woman's insistence upon two points: the necessity for discipline and training; and the fact that nursing was a vocation, demanding women of character, intellect and culture. The new nurses took charge of the hospitals of the land; wards and patients alike were scrubbed; and filth and disorder gave place to carbolic and fresh air. And in this field also, as well as in the sphere of medicine and surgery, it became evident that the modern era had begun.

Hospitals for the Insane.

May I now leave the main theme of this lecture for a few minutes to describe the evolution of three types of special hospitals—institutions for the insane, for infectious diseases and for tuberculosis—the story of which is a necessary part of our historical survey.

In the year 1246 there was built in London a priory to receive the Bishop of Bethlehem should he come to England. There is no record that he ever came and we next hear of the building in 1403 when, under the name of the Bethlehem Hospital, it was being used as a place of confinement for the unmanageable insane.

It was still the popular belief that the unfortunate sufferers were possessed of devils, with the result that insanity was regarded as a disgrace. The reason for placing them in an institution was to protect the general public, and the only "treatment" given seems to have been with the idea of driving out the devil by making its human habitation untenable. The wretched victims were chained in dark cellars, beaten, starved and otherwise maltreated and frequently died of cold.

The public conscience felt no pangs at this treatment, and it became a fashionable amusement to visit and laugh at the inmates of what was popularly known as Bedlam, a penny being charged for admission. And this was not exclusively an English entertainment. One of the show places of old Vienna was the "Narrenthurm" or lunatics' tower, and here as at Bedlam the insane were on view on payment of a small fee.

Harsh treatment was still prevalent in the eighteenth century although the barbarities of the Middle Ages were kept in the background. Apart from the administration of opium pills to melancholic patients there was no attempt at scientific treatment and insanity was still generally regarded as divine punishment for some personal guilt. The inmates, I cannot call them patients, were confined in cold damp cells and were miserably underfed.

The first attempt at humane treatment originated with William Tuke, who was not a physician but a Quaker tea merchant in York. Following the death of a Quaker inmate of York County Asylum under suspicious circumstances, he appealed to his friends to try to establish a retreat where the insane could be treated by quiet methods. Despite public apathy, he got his retreat opened in 1794 and (though a layman) remained at the head of it for a quarter of a century. Four years later Philippe Pinel, at the risk of his own life and liberty, struck off the chains from 49 insane patients at Bicêtre in France, and had them treated in hospital under lenient physicians.

The change from barbarous to humanitarian care of the insane marks the first stage in the evolution of the modern mental hospital. The second stage, the institution of scientific treatment and in particular the provision of occupational therapy, belongs to our own generation.

Infectious Diseases Hospitals.

The early history of infectious hospitals is bound up with the story of four diseases seldom seen in them today—leprosy, syphilis, smallpox and plague.

Lazar-houses for the isolation of lepers were mentioned by Gregory of Tours in the sixth century, but it was not until the Middle Ages, when leprosy spread far and wide throughout Europe, that the advantages of segregation really became apparent. Then lazar-houses multiplied rapidly and at one stage there were some 2,000 in France alone. Striking success attended this great movement, and by the end of the sixteenth century leprosy was so well stamped out in Western Europe that the lazar-houses were abolished or converted into general hospitals.

While leprosy declined, however, syphilis was spreading alarmingly, particularly in Italy where prostitution was rife. The authorities were awake to the contagiousness of the open tertiary sores, and as early as 1497 there were edicts forbidding syphilitics entrance to the inns and even to the churches. In 1552 Venice ordained that all those "ulcerated and afflicted with the French disease" should go for treatment to the places designated for them. In other cities the sufferers were accommodated in the now empty lazar-houses. Special hospitals for venereal diseases, such as the London Lock Hospital, came later.

Isolation hospitals for smallpox are mentioned in the oldest Japanese medical work, *"I Shinho"*, dated A.D. 982. Yet although there were serious epidemics in Rome in the third and fourth centuries, and although the disease ravaged the whole of Europe from the Middle Ages onwards, the sufferers do not seem to have been

isolated in special hospitals until the middle of the eighteenth century. The time factor probably accounted for this, the child being either dead or better before steps could be taken for its segregation.

Bubonic plague assumed special importance in the seventeenth century and, although the precise means of its spread were not known, it was recognized to be contagious. Gastaldi's edicts, issued when plague broke out in Rome in 1656, reached quite a high standard of sanitary legislation and might have been aimed at rats and fleas. A certificate of health was required of all travellers; the streets and sewers were cleaned; aqueducts were regularly inspected; places were designated for the disinfection of clothing and all popular gatherings were forbidden.

As in the case of smallpox, however, the isolation of sufferers from plague does not seem to have started before the eighteenth century, when Dr. Richard Mead, physician to Saint Thomas's Hospital, condemned the current practice of shutting up infected houses with sound and sick inmates together as both futile and cruel. At his suggestion "pest-houses" were opened some miles outside the city boundaries, to which all cases were brought for isolation and treatment.

General fever hospitals, the successors of the pest-houses, began to be built at the end of the eighteenth century, and the *Public Health Act* of 1875 finally made it compulsory for the local authorities to provide them. They also were located well outside the towns and were of a miserable and makeshift character at first. When epidemics occurred the sick used to be segregated in temporary huts or tents, or even in old battleships moored in the river estuaries.

Municipal isolation hospitals are a development of the last fifty years. Curiously enough, although we know it to be unnecessary, the practice of constructing them in remote situations has continued until the present day.

Hospitals for Tuberculosis.

There are comparatively few references to tuberculosis in the medical literature of Greece and Rome, although Galen suggested that sufferers should be treated to a liberal milk diet and the climatic therapy of sea voyages and high altitude. Although the disease was common in mediæval Europe, where it was known as the King's evil, there were no institutions for housing its victims. Scientific curiosity was frowned upon in those days or there might have been pavilions in the palace grounds where one could study the efficacy of the royal touch.

The Italians, who were pioneers of public health legislation, were the first to be concerned about the contagiousness of tuberculosis, and in the eighteenth century the Republic of Florence prescribed in detail the precautionary measures that were to be taken. These included boiling the sputum mugs, scrubbing the floor and painting the walls of any room which had harboured a patient. Venice and Naples soon afterwards provided special hospitals, but rather with the object of protecting the general public than of treating the disease.

Although a scheme for open-air treatment had been introduced in 1747 by the hardy Scots, it was not until 1840 that an English physician named Bodington wrote on the merit of fresh air and actually built the first sanatorium. But fresh air had gone out of fashion. The unfortunate man was so ridiculed and criticized that he gave up his project and finally converted his building into a mental asylum.

Nineteen years later Brehmer opened a sanatorium for phthisical patients in the clear mountain air of Gobersdorf in Germany. This succeeded and became the model for innumerable private sanatoria in Switzerland and in England. They were most expensive places, however, and consequently tuberculosis remained a serious menace to the poor until quite recently. There are now many sanatoria in England provided by the County Councils, and the aim is to have approximately one bed for every 5,000 of the population.

No history of tuberculosis hospitals would be complete without mention of the Papworth Village Settlement. It began in 1915 with one patient, but today it covers 500 acres of land and accommodates about 500 persons in its hospitals and 700 others in the cottages and hostels. Varrier-Jones, the founder, who died early this year, realized that tuberculosis is a social and economic problem as well as a medical one. The consumptive is generally a damaged life, and though he may obtain arrest of his disease through sanatorium treatment, he will generally break down in competition with healthy labour, suffering recurrence of disease, facing unemployment and losing hope.

At Papworth consumptives have been able to work and marry and rear healthy children, retaining their hope and self-respect. The sale of manufactured articles from their factories makes them largely self-supporting. In addition, patients with acute infections are treated in the hospital and research and teaching are being pushed ahead.

Modern Hospital Development.

We have seen how the introduction of anæsthetics, antiseptic surgery and trained nurses removed three of the worst horrors of hospital treatment and enormously increased the chances of cure. Gradually, institutional treatment, which had formerly been a deterrent to all but the sickest poor, became indispensable to them all.

In England the infirmary wards in the workhouses found themselves caring for thousands of destitute sick who were unable to gain admission to the voluntary hospitals. Conditions were bad at first as they were only attended by part-time medical officers and nursed by their fellow paupers. But after 1865 rate-provided infirmaries were built and these gradually obtained full-time medical officers, trained nurses and adequate equipment. They still differed from the voluntary hospitals in that they housed large numbers of patients with chronic diseases, who had to come into an institution to be nursed, and in some manufacturing towns as many as a third of the population went into the poor-law infirmary to die. But conditions steadily improved and finally the *Local Government Act* of 1930 abolished the *Poor Law* (which dated from the time of Queen Elizabeth), and the infirmaries became municipal hospitals. These have been opened to all classes on payment according to means and have been expanded into places of scientific treatment which compare reasonably well with the voluntary hospitals, whose total beds they now outnumber by two to one.

It goes without saying that during the last fifty years hospitals everywhere have found themselves increasing in complexity. The older subdivision into medical, surgical and maternity sections is no longer sufficient. Specialty after specialty has demanded its own wards and equipment; the kitchen is evolving into a scientific dietary department under a trained dietitian; the nurses' quarters have become almost a residential college, with preliminary training schools, lecture rooms and permanent tutors; the medical records department has become an elaborate statistical bureau; routine laboratory work now requires a staff of trained scientists and technicians.

A department which deserves more than passing mention is that of the almoner—the social service department. The name derives from the individual who distributed alms to the poor from the gates of the monastery in mediæval times. When the first lady almoner took up her duties, however, in a corner of the out-patient department of the Royal Free Hospital in London on a winter morning in 1895, her primary function was to prevent abuse of the hospital by persons able to pay for medical treatment. Today there are few voluntary hospitals of good repute that do not possess a well-staffed almoners' department. From being a sort of financial assessor, the trained social worker is now an important link in the hospital system. She supplies the physician with information about the social environment of his patient; she visits the home to make sure that the good done in the wards is not undone in the first few weeks after discharge; she puts deserving patients in touch with charitable organizations. It is her function to be the one really human link between sick men and women and the huge impersonal modern hospital.

PART III.

The Future of Nursing.

To complete this historical survey we need to look forward as well as backward, so that, being guided by the changes going on around us, we may discern something of the hospitals of the future.

A good deal of what I am going to say now will be controversial. But one thing is certain. Whatever the hospitals of the future are like, they will depend, no less than those of the past, upon the quality of their nursing service. Today hospitals in many parts of the world are finding difficulty in attracting enough suitable girls for training, and the problem will grow more acute as more of the general public expect hospital beds when they are ill. The nurse's pay, hours of work, recreation facilities and general conditions have already been improved, and at the other end of the scale hospitals have already made the intellectual standard for intending probationers as low as is compatible with safety. Yet there is still a shortage. To meet it I foresee that two important steps will be taken in years to come.

1. At present, half a nurse's time is spent on tasks that could be performed by any intelligent maid. I am sure that, eventually, such duties as preparing and carrying meals, making beds, changing napkins, tidying wards, preparing dressings and running messages will be lifted off her shoulders by the appointment of a permanent staff of women, midway in status between nurse and wardsmaid, who have some practical ability but no theoretical knowledge of disease. The appointment of such "nurse attendants" will, by eliminating domestic duties, make the life of the probationer more attractive to intelligent girls, and by allowing them to concentrate on specific nursing tasks it will enable them to learn in two years more than they now learn in four, thus bringing them sooner to the time when they can earn reasonable salaries as certificated nurses.

2. Secondly, some method will be devised for sparing probationers from the responsibility of providing the nursing services of the hospital. There will be a move to bring the status of the student nurse more into line with that of the medical student. Florence Nightingale envisaged the training school for nurses as something distinct from the hospital and this idea has already been applied at Yale. British and Australian hospitals have tried, in a manner that savours suspiciously of exploiting cheap labour, to make the probationer a worker and student in one. She certainly attends lectures, but in the wards, face to face with patients in whom she is supposed to recognize signs of illness, she is too busy "working" to receive much instruction at all. To employ additional staff nurses and tutor sisters in our hospitals will be expensive, but it will be done. For such a system will produce better nurses and so more benefit to the patients whom we serve.

Hospitals of the Future.

Another problem that the hospitals of the future will have to solve is the conflict between teaching and treatment, between the best interests of student and patient. This conflict takes many forms. If the interests of the student are paramount a hospital is apt to find that it has no room for a "case" that is not "interesting" regardless of the person's need for a hospital bed. On the other hand the busy surgeon, with a long list of operations to complete, has no time to present his slow and clumsy resident with "his first appendix"—it is infinitely quicker to do the job himself. And the physician who is supposed to impart instruction to students while attending to rows of out-patients seldom succeeds in doing justice to either.

It is my belief that the present distinction between voluntary and State hospitals will gradually fade and that separate teaching and non-teaching institutions will take their place. The teaching hospital will have as its chief purpose the training of medical students and of nurses, post-graduate instruction and all kinds of clinical research. Its bed capacity need not be great. I would remind you that Boerhaave's hospital at Leyden contained only twelve beds, yet he made it in his day the medical centre of Europe. The teaching hospital must have authority, however, to refuse admission to any patient, to transfer him elsewhere if he ceases to be suitable, and to conduct post-mortem examinations in all fatal cases.

It will be intimately connected with the medical school and the school of nursing. The visiting medical staff (selected for teaching ability as well as professional skill) will be paid by the university, which may even employ the tutor sisters also and issue a diploma of nursing. To compensate the patients for the irksomeness of serving as demonstration cases and as subjects of clinical research, hospital fees will be low, and the patients will have the added satisfaction of knowing that their disease is receiving the best investigation and treatment that medicine has to offer.

The non-teaching hospitals will be of a very different order. Each will serve its own district for which it will act as a kind of health centre. Its function will be, not to teach, not even to investigate for the purpose of adding to medical knowledge, but to cure the sick as economically and as speedily as possible. They will not experiment with new methods of treatment, but will apply the knowledge gained elsewhere. The scientific curiosity of physicians which is partly responsible for the rising cost of treatment may be given rein in the teaching hospitals, but not in these.

The non-teaching hospital may solve another present-day problem—the loss of his patient by the general practitioner when the patient goes to hospital. There is no administrative reason why a non-teaching hospital, which does not claim to undertake specialist investigations or treatment, should not be visited by all the practitioners in its area, each one looking after those patients whom he himself has admitted. Under such a scheme the patient would not have to be separated from the doctor of his choice, and the doctor himself would have the real benefit of connexion with a hospital, and of taking part in staff conferences.

In the capacity of district health centres these non-teaching hospitals will play an important part in the sphere of preventive medicine. There will necessarily be ante-natal and post-natal clinics in connexion with the obstetrical section, infant welfare and child guidance clinics in connexion with the children's department, and a tuberculosis clinic to which young adults will be encouraged to come for an X-ray examination and overhaul. Certain other present-day practices give a hint as to how this field will be developed. Hospital social workers, in connexion with the out-patient follow-up clinics, already visit patients' homes to see that they remain in good health. Preventive immunization against diphtheria and whooping-cough is already becoming a routine practice in children's hospital work. Endeavours are already being made to educate the public in matters of diet and personal hygiene by means of posters and leaflets in out-patient departments. Yet another recent step has been the development by hospitals of human milk bureaux, breast milk being collected daily from mothers in the neighbourhood for the use of hospital babies.

It is difficult to foretell what changes there will be in hospital construction. The last fifty years have seen many experiments, however, and as a result certain principles have emerged. As for size, it has been found that it is possible to make a hospital too large. The optimum capacity is now put by most authorities at 600 beds, and by some as low as 300. Increase in size may reduce slightly the maintenance cost per patient, but it confines the administrators increasingly to their offices, so that they find it impossible to supervise the working of the individual employee and the care of the individual patient.

As for their situation, the new Carolinian Hospital at Stockholm and the Birmingham Centre are but two examples of a modern tendency to build on the periphery of a city, whereby hospitals secure more space, better air, relative freedom from noise and, it is necessary to add, from air raids. We hardly appreciate pure air in Brisbane; but if you have been to Birmingham you will understand why they avoided the centre of the city. And although a peripheral location makes demands upon transport, it

helps to check in some measure the overcrowing of the out-patient department by people who can and should be treated elsewhere.

In the new Westminster Hospital, as a matter of fact, the "depressing out-patient department where patients with sundry ills mingle and wait" is no more. It has been replaced by a small distribution centre on the ground floor, from which the bulk of the out-patients, according to the obvious nature of their case, are sent at once to appropriate consulting rooms on the various upper floors, adjacent to wards devoted to similar diseases. Practitioners are encouraged to send their patients direct to the appropriate unit. There is an almoner's office on each floor, and one of its functions is to arrange out-patient attendances by appointment.

The largest wards in the newer hospitals contain only sixteen beds, or even fewer. This brings me to my last point. I have a feeling that there will be small, cheerful wards in the hospitals of the future, with less carbolized austerity but more comfort and more privacy for "public" patients. We shall learn at length to separate the convalescent from the dying. We shall bring the human touch into our large impersonal institutions. For we are coming to recognize that even "hospital cases" have their feelings and that human understanding is as important as scientific efficiency when we are caring for them.

BACILLUS TROPICUS, A NEW SPECIES ISOLATED FROM MAN AND ANIMALS DESCRIBED AND COMPARED WITH OTHER BACILLI RESEMBLING BACILLUS ANTHRACIS.[1]

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IN a previous paper (Heaslip, 1940) I reported the discovery and isolation of the bacillus described below. It was first seen in stained smears from mice inoculated with the blood of patients in the coastal region of North Queensland. Later it was found as a parasite in many species of rats and in bandicoots (*Isoodon torosus*) native to this area. It was frequently associated with a Gram-negative bipolar organism, which was stated to be a variant. Further work demonstrated that this claim could not be substantiated.

Although previous authors have described bacilli which have been isolated from man or animals, none corresponds with the new organism. Most known species of the genus *Bacillus* are saprophytes, and it is probable that many of the strains isolated from man and animals are variants of *Bacillus anthracis*. The previous reports of human infection with such organisms concern isolated cases only.

The preliminary part of this work was performed at the Commonwealth Health Laboratory at Cairns, North Queensland. Subsequently various strains were more fully investigated at Adelaide, and the results form the basis of this paper. The work was prematurely terminated on account of military service.

The Organism.

Morphology.

The organism consists of rods similar to *Bacillus anthracis*. The sides are parallel and the ends usually bluntly rounded, but may be truncate. Long and short chains, unjointed filaments, pairs and single organisms are seen. Long chains and filaments are seen only in cultures. Spores are formed rapidly, within twenty-four hours on solid media, more slowly in fluid media; they are not seen in the animal body during life. Motility is usual, and the peritrichate flagella are long and stout. With the older staining methods no capsule is seen, but sometimes, as when chains are present, a capsule is seen. However, with the Churchman and Emelianoff (1933) modification of Wright's stain, "capsules" can be demonstrated. The dimensions of the organisms in the blood are usually 2·0μ to 4·0μ by 1·0μ. In culture there may be longer forms, of which the longest are possibly unsegmented members; thicker forms, 3·0μ by 1·3μ, are fairly common; and there are thinner forms, 2·0μ to 4·0μ by 0·7μ.

The spores are usually oval or elongated, but may be spherical. These are usually terminal or subterminal, but may be central or subcentral in position. They measure 1·0μ to 2·2μ by 1·0μ, and may occupy practically the whole of the sporangial envelope. They may, or may not, cause bulging of the sporangia. Germination is polar and part of the envelope of the sporangium may remain attached to the spore. The sporangia may be in chains and many may contain a granule of residual bacillary substance, either at one or at both ends prior to maturation of the spore.

Staining Reactions.

When first isolated the organism is always Gram-positive, but in old cultures Gram-negative forms are common. It is not acid-fast, and stains readily with ordinary dyes. With Giemsa or carbol-thionin stain the bacilli frequently show lightly staining or non-staining areas, and these, when grouped centrally or subterminally, may simulate sporing forms or give the appearance of bipolar staining. Staining by the Gram method will resolve the difficulty. Such bacilli may be early sporangia.

Colonies.

On the agar plate, after twenty-four hours the colonies may be indistinguishable from those of *Bacillus anthracis*. Generally the edges are less curled. Sometimes the colonies have a perforated appearance. A short form gives granular colonies with irregular edges; the bacilli in these cultures tend quickly to become Gram-negative and show little chain formation. Mucoid colonies sometimes occur, and consist largely of a thin form which rapidly becomes Gram-negative.

On potato after three days a good growth is obtained and no pigment is produced.

On "gelatin stab" growth is best near and on the surface. There may be the typical inverted fir-tree type of growth after three days, liquefaction occurring late.

In broth at first there is usually some turbidity, but occasionally only a flocculent deposit occurs indistinguishable from that of *Bacillus anthracis*. Later settling usually occurs, but there may be surface growth with pellicle formation.

In inspissated serum a good growth is obtained; liquefaction proceeds with variable rapidity and is usually apparent in twenty-four hours.

Resistance.

The vegetative forms are killed at 90° C., but not at 85° C., in ten minutes. Spores are usually killed by thirty minutes' boiling or less.

Metabolism.

The organism is an aerobe and facultative anaerobe. It grows under anaerobic conditions, but the growth is poor and atypical. It does not grow readily outside the animal body at 37° C., and culture has been initiated at this temperature only when the inoculum is taken straight from the living source to the incubator. It grows readily on or in ordinary media at temperatures between 15° and 32° C. Most colonies on blood-agar produce a zone of hæmolysis in twenty-four hours, but some do not. In whole blood it produces partial, or in time complete hæmolysis, with a characteristic purplish-brown coloration and a smell resembling decomposed glue. If clot is present it is partially digested. It does not produce a filterable toxin. Intraperitoneal injection of 0·3 cubic centimetre of the deposit from an old broth culture is capable of killing mice in a few minutes. The supernatant fluid is not lethal in ordinary doses.

[1] This work was carried out with the aid of grants from the National Health and Medical Research Council to Dr. E. H. Derrick, Director of the Laboratory of Pathology and Microbiology, Brisbane, Queensland, and latterly to the author.

Biochemical Properties.

Acid without gas is produced from glucose and maltose. Some acidity may be produced from mannite, saccharose, lactose and dulcite. The indol, methyl-red and Vosges-Proskauer reactions are not produced. Hydrogen sulphide is not produced, but ammonia is. Methylene blue is reduced, and the catalase reaction is strongly positive. Litmus milk is coagulated and decolorized. Later the clot is partially or completely digested and finally the whey may show a delicate violet surface coloration. The purplish-brown colour seen in hæmolysed whole blood is due to the complete absence of oxyhæmoglobin, as revealed by a spectroscopic examination performed by Mr. R. A. Wyndham, of this institute.

Serological Observations.

A stable suspension of the organism for agglutination tests could not be obtained.

A partial antigenic analysis gave the following results. From strain M a protein-free solution of carbohydrate was obtained, which was precipitated by serum from a rabbit previously injected intravenously with graduated doses of the same strain. Normal rabbit serum, serum from patients other than those in the endemic area, and normal and anti-diphtheritic horse serum gave no precipitate. Two samples of anti-anthrax horse serum gave a good precipitate.

Absorption tests were performed with six strains of *Bacillus tropicus*, two strains of *Bacillus anthracis*, a strain of *Bacillus subtilis* and three unidentified types of bacilli. Of these only strain M and two other strains of *Bacillus tropicus* absorbed the precipitin in the prepared rabbit serum. One of the strains of *Bacillus anthracis* was that used to produce the anti-anthrax serum. Neither *Bacillus anthracis* nor strain M absorbed the precipitins in the anti-anthrax serum. There were therefore at least two antigenic types of *Bacillus tropicus* amongst those used, and there appears to be an antigenic relationship between *Bacillus anthracis* and *Bacillus tropicus*.

Serum from 15 patients infected with the bacillus gave a precipitate with the carbohydrate solution; but strain M absorbed the precipitins from only two of the specimens of serum. Absorption was not complete, although one of these two specimens was from the patient from whom strain M was obtained.

Specimens of serum from four patients with clinical signs of infection, but from whose blood no organisms could be grown, and from four patients from whose blood only the Gram-negative bipolar organism was recovered, all precipitated the carbohydrate solution.

Pathogenicity.

Mice, guinea-pigs and rabbits are killed by varying doses of the organisms. For mice the lethal dose may be as little as 0·05 cubic centimetre of a broth culture forty-eight hours old. If death does not occur within forty-eight hours the animal usually recovers. The bacillus is probably the causal agent of a fever in man with no known mortality rate, which occurs in North Queensland, and which has recently been distinguished from tsutsugamushi disease (Heaslip, 1940).

Previous Reports of Infection with Bacilli.

The following summaries of previous reports of infection with members of the genus *Bacillus* have been included in this paper for three reasons: (i) to demonstrate the lack of resemblance between these bacilli and *Bacillus tropicus*; (ii) to show that in many instances these bacilli are probably variants of *Bacillus anthracis*; and (iii) to supply a bibliography relating to these infections.

In several instances the original reports are not available in Australia, and I have had to use citations. Some of these have only a reference value. Even where the original papers are available, there is often a singular lack of significant data.

1. Foà and Bonome (1889) saw a tanner suffering from clinical anthrax who died after five days. At post-mortem examination exclusively anthrax-like bacilli were found in all organs. Inoculation of particles of spleen into mice, guinea-pigs and rabbits caused death within forty-eight hours with atypical œdema. The bacilli grew best at 30° to 32° C., and were short, thick and Gram-negative. At 18° to 20° C. Gram-positive bacilli grew. No motility or spore formation was observed. Rabbits were particularly sensitive and showed both œdema and gas formation.

2. L. Klein in 1889 found an organism which was named *Bacillus sessilis* in the blood of a cow dead from suspected anthrax. It was not pathogenic for guinea-pigs.

3. In 1896 Wilach (cited by Poppe, 1922) obtained atypical anthrax bacilli from the blood of a cow which died of suspected anthrax.

4. McFarland (1898) found a single colony of bacilli on a plate inoculated with pus from an abscess. Morphologically and culturally the organism resembled *Bacillus anthracis*, which had been used recently in the laboratory; but it proved to be non-pathogenic for mice, guinea-pigs and rabbits.

5. Schulz (1901) isolated from the milk of a sick goat a bacillus morphologically and culturally identical with *Bacillus anthracis*, except that it formed a surface pellicle in broth. It was not pathogenic for mice.

6. Bongert (1903) inoculated agar plates with material from animals suspected of having anthrax. In addition to *Bacillus anthracis* he isolated large motile bacilli which resembled *Bacillus anthracis* morphologically and culturally, but were almost avirulent for mice.

7. Ottolenghi (1903) found an anthrax-like bacillus in blood collected from a public slaughterhouse. It varied from *Bacillus anthracis* only in showing considerable variations in virulence.

8. Kaesewurm in 1904 (cited by Poppe, 1922) found anthrax-like bacilli in milk and blood.

9. In 1909 Fitch (cited by Wagner, 1923) recovered a motile bacillus from the blood of a horse with clinical anthrax. The organism was not pathogenic for small animals.

10. In 1910 Barabaschi (cited by Sweany and Pinner, 1925) recovered from a dead goat an organism thought to be *Bacillus subtilis*.

11. Wilamowski (1912) reported fatal infection in man with a motile, Gram-positive, spore-bearing bacillus. Broth culture was turbid and 0·5 cubic centimetre killed mice in twelve hours.

12. Müller (1912) reported the isolation of a capsulated, non-sporing anthrax-like bacillus from a cow dead of anthrax.

13. Seitz (1913) in Germany, recovered a bacillus regarded as a pathogenic *Bacillus subtilis* from the stools in a case of enteritis. It was fatal to mice.

14. Senge (1913) related the case of a shoemaker's wife, who died of meningitis after a spinal anæsthetic. From the cerebro-spinal fluid was grown a Gram-positive, non-motile sporing bacillus. Spores were viable after twelve hours' boiling. It was pathogenic for mice.

15. Poppe (1913) cites the case of a slaughterman, who killed a pig suffering from anthrax, contracted the disease and died. The bacillus recovered from the pig at first killed mice and guinea-pigs, but pathogenicity decreased with cultivation.

16. Neufeld (1913) obtained a bacillus by venepuncture from a fatal human case of supposed anthrax. It was almost avirulent for mice.

17. Pfeiler and Drescher (1913) isolated a bacillus from a pig dead from gangrenous pneumonia. It was avirulent for guinea-pigs and mice.

18. Bitter (1913) isolated three strains of bacilli. The first was from a pustule exhibited by a patient believed to have anthrax.

19. The second strain found by Bitter was from the cerebro-spinal fluid obtained from a patient thought to have a meningococcal infection.

20. Bitter's third strain was from a pustule of a human patient suspected of suffering from anthrax.

All Bitter's three strains closely resembled *Bacillus anthracis*, but showed no pathogenicity for laboratory animals. Bitter named the organism *Bacillus gyroides*.

21. Wagner (1923) quotes a case record from *"Sanitätsbericht über die Kgl. preussische Armee"*, 1913, at page 23. A sergeant contracted clinical anthrax. The microscopic and cultural findings confirmed this diagnosis, but the organisms were avirulent for mice.

22. Sheen and Klein (1915) recovered *"Bacillus anthracoides"* from a war wound caused by a shattered trigger-guard. It killed a mouse in twenty-four hours.

23. Schurmann (1917) reported a case of meningitis in a boy from whom a bacillus was recovered which gave typical anthrax colonies. Inoculated mice died within forty-eight hours, but guinea-pigs were resistant.

24. Wagner (1923) reported the culture of anthrax-like bacilli from five patients. The first was suffering from suspected sepsis, and the organisms were not virulent for mice.

25. Wagner's second patient had an infected knee joint and the bacilli from it were not virulent for small animals.

26. Wagner's third patient was suffering from suspected anthrax, but the organisms were motile and did not kill small animals.

27. Wagner's fourth patient was a leather worker with clinical anthrax. The bacilli were slightly pathogenic for small animals.

28. Wagner's fifth patient was a boy with meningitis who subsequently recovered. The bacilli found in the cerebro-spinal fluid were avirulent for mice.

29. Wagner also examined lymphatic glands from a pig infected with anthrax, and recovered from them organisms rapidly fatal for mice, but differing materially from *Bacillus anthracis*.

30. Professor E. W. Hurst (personal communication), in 1924, when in England, examined the cerebro-spinal fluid from a butcher who received a fatal perforating wound of the brain while slaughtering an ox. The fluid contained few cells, but was opalescent with anthrax-like bacilli. No animal tests were made.

31. Seifert (1925) reported the case of a street-cleaner with a condition resembling anthrax. The infecting bacillus was not virulent for mice.

32. Sweany and Pinner (1925) isolated an organism from a human patient with miliary tuberculosis. They claimed that it was *Bacillus subtilis*, and that it killed one of two rats. There is no evidence to support either claim.

33. Bais (1927) reported the isolation of *"Bacillus subtilis"* from a Javanese coolie with lung cavitation. The organism was not recovered from either the cavity or the spleen by attempted culture after death. Prior to death, blood was withdrawn on two occasions and shaken with agar. Black colonies resulted, the superficial ones showing hæmolysis. Spores were central.

34. Bais cites Keleman as reporting in 1925 a case of sepsis and pneumonia following surgical infection with *"Bacillus subtilis"*.

35. Grüttner (1929) carried out an examination of seven pigs, one suspected of suffering from anthrax. One was not infected; from one *Bacillus anthracis* alone was recovered; in two, both *Bacillus anthracis* and anthrax-like bacilli were present; and in the other three only anthrax-like bacilli were found. The last-mentioned were not pathogenic for mice.

36. On another occasion Grüttner examined a pig which had been ill. From the thigh muscles, which showed hæmorrhagic effusions, pseudo-anthrax bacilli were recovered. They did not kill laboratory animals.

37. Antunovic-Mikacic and Dojmi are listed in the *Index Medicus* as reporting in 1932 a fatal case of sepsis from *Bacillus anthracoides*.

38. Lacorte (1932), in Brazil, reported a case of nephrosis terminated by death from acute serositis. Pus from a small closed blister of the pleura was cultured and gave rise to the growth of an organism which the author named *Bacillus serositidis*. It did not kill laboratory animals.

39. Gheorghiu (1934) reported that a strain of bacillus, recovered from horses of a cavalry regiment during an outbreak of anthrax, lost its virulence for a rabbit after cultivation on agar, but injections of it protected the rabbit against virulent *Bacillus anthracis*.

40. Bruynoghe and Ronse (1937) reported a case of meningeal infection due to *"anthracoid bacilli"*. Two types of colony occurred on agar, smooth and rough. The former type was stable; the latter gave rise to both types of colony.

Discussion.

Classification.

It is obvious from the description given that *Bacillus tropicus* belongs to Group A, 1 of Division I in Bergey's classification (1939). Thus it is mesophilic and aerobic, produces no gas from carbohydrates and is motile. However, it seems impractical to attempt to fit it into any of the further subdivisions, since the spores are occasionally central, may bulge the sporangia, and may be spherical. While the diameter of the spores is almost constant, the length varies considerably, and the ratio of spores to length therefore varies also. Biochemical and metabolic activities also vary.

It is important to note that Bergey and his co-authors (1939) are "inclined to think" that *Bacillus anthracis* should be in the *Bacillus subtilis* group, from which it has been separated on account of its lack of motility. They point out that the motility of *Bacillus mycoides* is also under dispute.

Hueppe and Wood, in 1889, suggested that parasitic bacteria were modified forms of the saprophytes, having acquired the ability to split living protein at body temperature with the production of toxic substances. They argued that in these circumstances saprophytes could be used to produce immunity, and reported a measure of success when using *Bacillus anthracoides* as a protection against anthrax.

This observation, in connexion with the variability of certain members of the genus *Bacillus*, supports the conception that functional ability might be a better basis for classification than physical characteristics.

TABLE I.

Showing the Relationship between the Organisms and the Morbid Conditions in Thirty-nine Cases of Anthrax-like Infections.

Type of Case.	Organisms.			Totals.
	No Data Available.	Not Pathogenic for Laboratory Animals.	Pathogenic for Laboratory Animals.	
Probable anthrax.	2 (Cases 3, 12)	10 (Cases 2, 6, 9, 16, 18, 20, 21, 26, 27, 35)	4 (Cases 1, 15, 29, 39)	16
Possible anthrax.	1 (Case 30)	2 (Cases 31, 36)	2 (Cases 11, 23)	5
Anthrax not suspected.	4 (Cases 10, 34, 37, 40)	5 (Cases 17, 19, 25, 28, 38)	1 (Case 14)	10
Relation between Organism and Morbidity Unknown.	2 (Cases 8, 33)	4 (Cases 4, 5, 24, 32)	3 (Cases 7, 13, 22)	9
Total ..	9	21	10	40

Anthrax Variants.

The 40 cases of "anthrax-like" infections cited above are set out in Table I, from which it may be seen that in nine instances the relationship of the organism to the morbid condition is not known. In one of these the original report is not available; in the other eight there is no evidence that the organism was not maintaining a saprophytic existence. In the three instances in which the organism was pathogenic to laboratory animals, it was recovered from (*a*) blood collected in a public slaughterhouse, (*b*) the stools of a patient with enteritis, and (*c*) a war-wound caused by a shattered trigger-guard. It is possible that the first of these was a variant of *Bacillus anthracis*. It is worth noting that the thirty-second and thirty-third patients were respectively suffering from miliary tuberculosis and lung cavitation.

ILLUSTRATIONS TO THE ARTICLE BY Dr. W. G. HEASLIP.

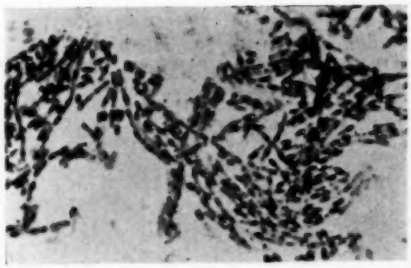

Figure I.
Sporangia and spores of *Bacillus tropicus*. Agar plate culture, 24 hours' incubation. Stained with carbol fuchsin and methylene blue. × 930.

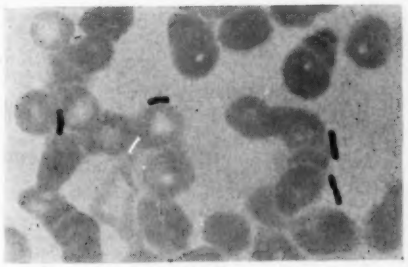

Figure II.
Direct blood smear from human patient. Giemsa stain. × 930.

ILLUSTRATIONS TO THE ARTICLE BY Dr. C. A. DUNCAN.

Figure I.
Photomicrograph of the cerebellum showing tumour tissue on the surface. × 5.

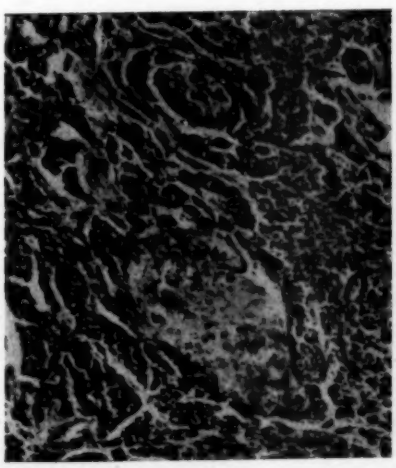

Figure II.
Photomicrograph showing tumour tissue surrounding nerve bundles. × 60.

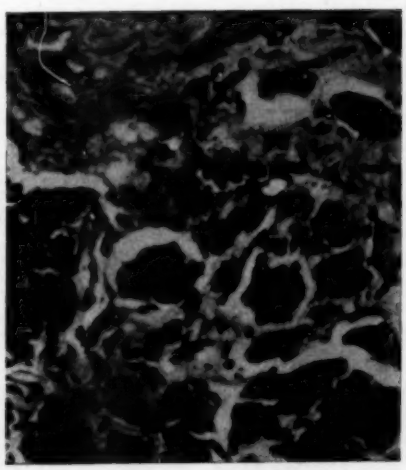

Figure III.
Photomicrograph showing tumour invasion of ganglion cells. × 200.

ILLUSTRATIONS TO THE ARTICLE BY DR. HANNAFORD SCHAFER.

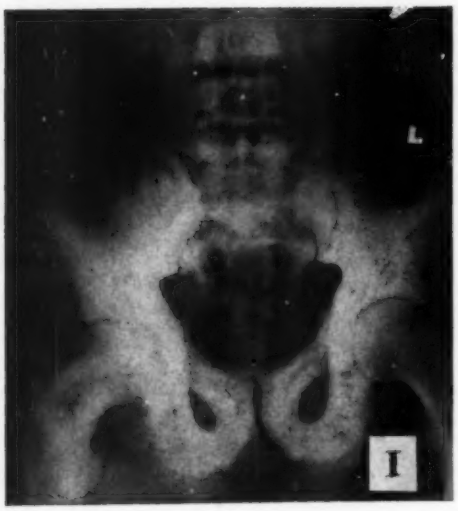

FIGURE I.

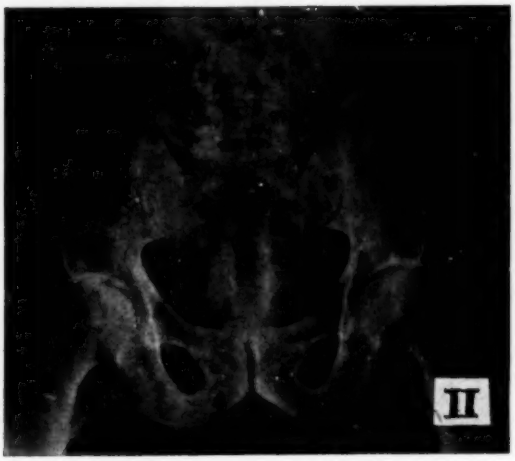

FIGURE II.

FIGURE III.

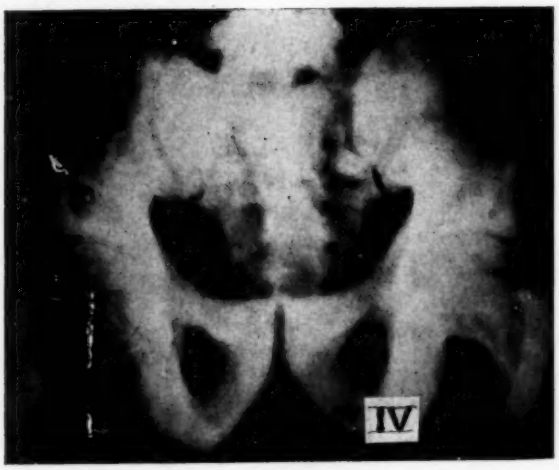

FIGURE IV.

Of the other 31 cases, 16 were regarded clinically as of anthrax and five as of suspected anthrax. In each of these 21 cases it is probable that the organism concerned was a variant of *Bacillus anthracis*. This will be discussed later. One patient (Case 11) of the five suspected of having anthrax had pulmonary lesions, and two (Cases 23 and 30) had meningitis.

In the remaining ten cases, in which anthrax was not suspected, there is a remarkable grouping of pathological findings. In one instance the report is not available (Case 37); but in the other nine the organisms were recovered from (*a*) fluid from the knee (Case 25), (*b*) cerebro-spinal fluid (Cases 14, 19, 28 and 40), and (*c*) pulmonary lesions (Cases 10, 17, 34 and 37). In Case 14 the organism was pathogenic for laboratory animals; the patient was a shoemaker's wife.

In five instances (Cases 10, 13, 32, 33 and 34) the organism was "identified" with *Bacillus subtilis*. The belief that this bacillus may sometimes be a pathogen apparently arose from the reports quoted by Axenfeld (1908). These reveal wide differences in findings; they also reveal that pathogenicity, when it occurred, was the result of injecting organisms into the vitreous. This is an inadequate reason for assuming that *Bacillus subtilis* may be a natural pathogen, particularly in view of the apparent variability of *Bacillus anthracis*.

Variations in Bacillus anthracis.

The claim that many of the above-mentioned anthrax-like organisms are variants of *Bacillus anthracis* is based upon the following considerations: (i) The clinical findings were frequently those of anthrax. In several instances the authors have emphasized that the condition was typical of anthrax. (ii) *Bacillus anthracis* has long been known to be unstable. Ewart (1878) observed occasional individual motility, and in 1882 Buchner (cited by Poppe, 1922) claimed to have produced a motile variant from *Bacillus anthracis*. I have observed hæmolysis within forty-eight hours with a fully virulent strain. In 1881 Pasteur (cited by Topley and Wilson, 1936) artificially and readily established a state of lowered virulence in cultures. Preisz (1911) reported that Pasteur's results were due to the production of avirulent variants. Finally, the papers by Haag (1927), Scalfi (1929), Uémara (1914), Poppe (1922) and others, show clearly the difficulty in distinguishing between variants of *Bacillus anthracis* and other bacilli. (iii) The above citations show that there is no sharp line of demarcation between the clinical picture of anthrax and that of the anthrax-like infections. It ranges from the typical through the probable and possible to the frankly unsuspected. Similarly, there is no sharp differentiation between the organisms incriminated. There may be mere loss of sporing ability or of capsule, or the organism may show slight motility with consequent turbidity in broth culture. Loss of virulence may be intermittent, partial, progressive or complete. (iv) In pigs, relatively resistant to infection with anthrax, both *Bacillus anthracis* and anthrax-like bacilli have been found. (v) In the cases in which anthrax was not suspected there is a remarkable grouping of the pathological findings with diversity of type among the associated bacilli. Moreover, lung lesions are frequently found in rats and mice infested with *Bacillus tropicus*, and this organism has been isolated from the sputum in man (Heaslip, 1940).

Comparison of Bacillus tropicus and Bacillus anthracis.

Within certain limits morphology seems to have little significance in this genus, and such differences as exist between *Bacillus tropicus* and *Bacillus anthracis* may be ignored. The biochemical reactions are essentially the same for the two members, and the partial serological investigation suggests an antigenic relationship between the two. Ordinarily one is motile and the other is not, and the capsule of *Bacillus anthracis* can be demonstrated by the usual staining methods, while that of *Bacillus tropicus* cannot. The essential difference is that *Bacillus anthracis* causes a fatal infection in man, whereas *Bacillus tropicus* does not.

It is possible that *Bacillus tropicus* is a more or less fixed, attenuated form of *Bacillus anthracis*, or that both were originally saprophytes which became pathogens, virulence being more fully developed in one than the other. *Bacillus tropicus* may therefore be a variant of *Bacillus anthracis*, or both may be variants of a saprophytic bacillus. However, pending further work on the genus, it was thought advisable to give *Bacillus tropicus* a specific name.

Comparison of Bacillus tropicus with other Anthrax-like Bacilli.

Only one of the organisms listed above shows a significant resemblance to *Bacillus tropicus*. It is of special interest, as it was isolated by Bais (1927) in the tropics (Sumatra). It was recovered during life, but not after death, which fact suggests cultural peculiarities corresponding with those of *Bacillus tropicus*. With ordinary media, culture of the latter can be initiated only at 37° C., when the temperature of the inoculum does not vary significantly during transfer from the patient or animal to the incubator. Presumably this condition was fulfilled when Bais made his blood cultures, but not when he used inoculum procured after death. The position of the spores is probably not significant. It is doubtful whether the organism was the cause of either the lung cavitation or death. The other data supplied do not conflict with what is known of *Bacillus tropicus*, except that the colonies in the agar-shake cultures are described as "black". *Bacillus tropicus* gives dark grey colonies on blood-agar. It is possible, therefore, that the organism isolated by Bais was identical with *Bacillus tropicus*.

As far as can be ascertained, the only other one of these organisms isolated in the tropics was *Bacillus serositidis*, which differs appreciably from *Bacillus tropicus*, but appears to have caused death in man.

The only other organisms mentioned in this series are *Bacillus gyroides* and *Bacillus sessilis*. Some were supposed to be *Bacillus subtilis* and others *Bacillus anthracoides*. Bergey (1939) does not list *Bacillus gyroides*, and regards the names *Bacillus sessilis* and *Bacillus anthracoides* as synonyms of *Bacillus megatherium*.

The grounds on which *Bacillus tropicus* has been designated as a new species are the cultural peculiarity and the common occurrence in man and animals in the coastal region of North Queensland, and possibly elsewhere. Owing to the apparent restriction of the organism to the tropics and to the fact that it was isolated in the tropical portion of Australia, it has been named *Bacillus tropicus*.

Cultures have been deposited in the Laboratory of Pathology and Microbiology, Brisbane, and the Institute of Medical and Veterinary Science, Adelaide, and sent to the United States Department of Agriculture, Washington, D.C.

Summary.

1. A new species of bacillus occurring in man and animals in North Queensland, Australia, has been described and named *Bacillus tropicus*. It is lethal for small animals in large doses and occasionally in small doses, and is probably the cause of a febrile condition in man known as coastal fever.

2. A list of the previously reported infections of man and animals with anthrax-like organisms is given. Many of the strains isolated were probably variants of *Bacillus anthracis*.

3. The description of a strain recovered from the blood of a Javanese coolie in Sumatra suggests a similarity to *Bacillus tropicus*.

4. *Bacillus tropicus* is shown to belong to the Group A 1 of Division I of Bergey's classification of bacilli, but does not fit into any of the further subdivisions. It is compared with, and may be a variant of, *Bacillus anthracis*.

Acknowledgements.

I wish to express my thanks to all those who have assisted me in this work, particularly the members of the staff of the Commonwealth Health Laboratory, Cairns, the staff of the Laboratory of Pathology and Microbiology,

Brisbane, and the staff of the Institute of Medical and Veterinary Science, Adelaide, and to my assistant, Mr. C. Nelson, for his uncomplaining cooperation. I am indebted to Sir Raphael Cilento, Director-General of Health and Medical Services, Queensland, for permission to publish this paper.

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PERCUTANEOUS TREATMENT OF VITAMIN K DEFICIENCY.

By P. FANTL AND A. B. CORKILL,

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THE administration of vitamin *K* for prothrombin deficiency in obstructive jaundice and neonatal hæmorrhage is now a well-recognized therapeutic procedure. Vitamin *K* or the synthetic compound 2-methyl-1,4-naphthoquinone may be given orally with bile salts or intramuscularly in oily solution. Recently water-soluble derivatives have been introduced, and these may be administered intravenously. In response to a request from clinicians of the Alfred Hospital for supplies of a compound with vitamin *K* activity, 2-methyl-1,4-naphthoquinone was prepared. As this compound is soluble in fat, it appeared likely that it would be absorbed through the skin. Accordingly, an oily solution was prepared and administered in the form of an inunction.

The first case in which this procedure was adopted was one of obstructive jaundice in which operation had been performed. Two days later slight but persistent bleeding from the incision developed. The plasma clotting time, estimated by the method of Quick,[1] was forty seconds, as compared with twenty seconds in the case of two controls. This, from Quick's data, corresponds to a prothrombin content of about 20%. An area of skin of approximately 100 square centimetres was cleaned with ether and one cubic centimetre of a 1% solution of 2-methyl-1,4-naphthoquinone in cod-liver oil was rubbed in with a glass spatula. Absorption appeared complete after three hours. Twenty-two hours later the plasma clotting time had fallen to 22 seconds and all bleeding had stopped. In another case of obstructive jaundice the prothrombin content of the plasma estimated pre-operatively was 37% of the normal (clotting time 27 seconds), and 22 hours after inunction it had risen to 80% (clotting time 20·5 seconds). In a case of a premature child with neonatal hæmorrhage, 0·5 millilitre of the solution was applied on two successive days. On the third day all clinical symptoms of jaundice had disappeared; but unfortunately no prothrombin determinations were carried out.

Up to the present, seven additional cases of obstructive jaundice before and after operation have been observed. In six, normal plasma clotting times were found, and therefore no necessity for application of vitamin *K* arose. In the seventh case the clotting time was 22 seconds before inunction, and 20·5 seconds 27 hours after inunction.

The inunction has been applied to four normal persons and in no case was there any change in the plasma clotting time, nor could any untoward symptoms be observed.

Although this report deals with but a few cases, it appears justifiable to assume that the rise in prothrombin level in the cases mentioned was due to absorption through the skin of 2-methyl-1,4-naphthoquinone. Strong evidence for this assumption is given by a recently published paper by de Beer *et alii*,[2] who have shown that 2-methyl-1,4-naphthoquinone dissolved in various organic solvents is absorbed by the skin of chicks which had previously been

maintained on a diet deficient in vitamin *K*. The prolonged clotting time of the blood of these birds was considerably reduced by this treatment.

In view of the suggestions made by several workers[3][4][5] to apply preparations with vitamin *K* activity to all women in the last days of gestation in order to prevent neonatal hæmorrhage of the infant, the inunction should be considered as a simple, effective and cheap procedure.

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Reports of Cases.

MENINGEAL CARCINOSIS CAUSING DEAFNESS.

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MENINGEAL carcinosis is a rare and interesting condition. Several cases have been recorded and a summary of these has been made by Willis (1934). The carcinosis occurs (i) secondary to metastatic growth in the central nervous system, (ii) by invasion of the meninges from an extrathecal growth, and (iii) by direct hæmic metastasis. Of these types, the first is the most usual and the second and third have not as yet been completely demonstrated. Extension along the cranial nerves in meningeal carcinosis is sufficiently rare to justify a case report.

Clinical Record.

V.U., a male patient, aged fifty-six years, was admitted to the Royal Hobart Hospital on June 27, 1939, with a provisional diagnosis of "gastric ulcer, post-influenzal deafness". The patient was in a stuporose condition, and no history could be obtained at the time from other sources, except that deafness had been present for two or three weeks and vomiting for several weeks. On examination no anatomical abnormality was detected in the ears. The fundi were normal, but both pupils were fixed, the right being five millimetres in diameter and the left three millimetres. The left side of the face appeared paralysed.

The blood urea content was estimated at 25 milligrammes of urea per 100 cubic centimetres of blood. The Kline test produced no reaction. Cerebro-spinal fluid under increased pressure was removed; it contained a greatly increased amount of protein, a reduced level of chlorides to 650 milligrammes per 100 cubic centimetres, and the following distribution of cells per cubic millimetre: 180 small lymphocytes, 10 polymorphonuclear cells, 50 red corpuscles, 30 giant cells (considered to be tumour cells) and 40 unknown cells (also considered to be tumour cells). Encephalographic examination after the introduction of 40 cubic centimetres of air revealed no definite filling defect. The pulse rate was always fast and varied between 140 and 180 per minute. The temperature on the patient's admission to hospital was 98° F. and it rose to 105° F. at the time of death, which occurred on July 15, 1939.

Post-Mortem Findings.

The brain only was removed by a resident medical officer and fixed in formalin for later examination. It was normal except for thin, smooth, whitish tissue, which was spread out over the brain stem and cerebellum, obliterating the convolutions of the latter. This tumour tissue also surrounded the intracranial portions of the auditory nerves, making them appear like thick white cords. Tumour tissue had invaded a Gasserian ganglion. An oval nodule measuring 10·0 by 5·0 by 5·0 millimetres was present on the surface of the left half of the cerebellum. The meninges of other parts of the brain were not invaded, and no other tumour nodule was found. Examination of microscopic sections shows the tumour tissue to consist of large rounded cells, with deeply staining nuclei (many in mitosis). The cells are arranged in compact masses, and necrosis can be seen. In places a glandular arrangement is found.

In certain areas the cells are plainly of the "signet ring" type.

In the cerebellum the cells are spread out to form a thin layer of tumour tissue, which extends down into the convolutions (Figure I).

Tumour cells have completely surrounded and invaded the perineural lymphatics of the auditory nerves (Figure II), but except in one area they have not extended into a nerve.

In the Gasserian ganglion tumour cells are seen surrounding large ganglion cells (Figure III).

Discussion.

The primary origin of this neoplasm was not found, as post-mortem examination was incomplete; but the tendency to form acini and the presence of "signet ring" cells suggested a gastric origin, and it was afterwards discovered that the patient had been advised to undergo an X-ray examination by a private practitioner on June 1, 1939. This was carried out after a barium meal and revealed "a deformity and filling defect considered due to a gastric neoplasm". Spread to the meninges and cranial nerves appeared to be from the small, blood-borne, cerebellar metastasis.

Summary.

A case of carcinoma of the stomach is described, in which (i) a metastasis developed in the cerebellum, (ii) invasion occurred to the meninges of the brain stem and cerebellum and to cranial nerves, (iii) tumour cells appeared in the cerebro-spinal fluid, and (iv) deafness resulted from pressure around the auditory nerves.

Acknowledgements.

I am indebted to Dr. Muir, superintendent of the Royal Hobart Hospital, for access to the clinical records, and to Dr. R. Willis for confirming the histological findings.

Bibliography.

R. Willis: "The Spread of Tumours in the Human Body", 1934, page 366.

RHEUMATIC MISNOMERS.

By D. P. HANNAFORD SCHAFER, M.R.C.P. (London), M.B., B.S. (Melbourne), M.R.C.S. (England), M.R.A.C.P.,
Physician to Brisbane General Hospital.

THE demand of patients in these days for the immediate diagnosis of the most obscure and occult symptoms can so readily be surmounted by the label of "rheumatism" that I am prompted to report the following three cases which came to my notice recently. All these lesions in their earlier stages were diagnosed as rheumatism, and so these case reports and illustrations are published to remind us of the likely pitfalls of this facile diagnosis, to which all of us are susceptible.

These cases have been recorded in outline only, to stress the above fact. The salient points alone have been mentioned.

Case I.

Mr. A.B., aged forty-nine years, complained of pain in the right hip joint and over the right buttock extending down the back of the right thigh for the previous six months. As well as this, pain was present in the right knee joint, extending to the leg and to the dorsum of the right foot. There was also persistent backache. His pain varied in location and had become so intense that he was completely disabled. His occupation was that of a working contractor, and as the pain was increasing it had become impossible for him to work.

On examination the only abnormal objective finding was a limitation of the mobility in all directions of the right hip joint. There was neither wasting nor bowing of the long bones. The leg was not shortened. The lesion had been labelled "sciatica" and "osteoarthritis", and he had received during the six months all the usual rheumatic treatment, including short-wave therapy, diathermy *et cetera*.

Figure I shows the exact nature of his condition to be *osteitis deformans*. The radiologist's report is as follows:

> The radiograph shows *osteitis deformans* involving particularly the innominate bones and the head of the right femur. Note the diffuse increase in density with relative obliteration of the cancellous trabeculæ. The vertex of the skull shows a comparatively early stage.

As can be imagined, in the early stages this patient's condition could have been most readily overlooked, especially as Paget's disease commonly affects the pelvis primarily. All treatment was stopped except the giving of Lugol's iodine, 12 minims three times a day, and with this treatment alone the greater proportion of his pain has been relieved and he has been able to resume his duties in a modified capacity.

Case II.

Mr. T.K.H., aged fifty-seven years, suffered from influenza in March, 1940, and returned to duty before he had fully recovered. A day or so later he developed "lumbago". This caused approximately three weeks' absence from work. He took a further five weeks' leave of absence, but his "rheumatism" still worried him. There was pain in the muscles, especially in the back. By July, 1940, he had noticed that pain was present not only in the back, but also over the lower costal margins. He was able to return to work in August and, as he said, with the advent of summer he expected to feel better. The pain increased in severity, and not only did it persist in the lumbar and lower thoracic regions, but it also extended to the thighs and legs.

His general health failed commensurately with the irregularity and severity of the pain. His weight fell from eleven stone twelve pounds to ten stone seven pounds, his weight at the time of consultation. He had been given every remedy for rheumatism, including alterations to his diet.

At the time of consultation his efficiency was greatly impaired; he could get about with only the greatest effort owing to the severe pain. He had noticed that the pain disappeared when he lay down, and at no time has he had any joint symptoms. The most noticeable feature has been the manner in which for months the pain has moved from one site to another until, as he said, every muscle in the back was affected. However, the main distribution of the pain was in the lumbar region and over the buttocks. Two and a half years previously he suffered from an attack of "true" lumbago.

On examination there was no abnormality to be noticed, except that of a patient who has lost weight and shows evidence of loss of vitality. The hæmoglobin value had dropped from 91% to 86% and a blood count gave the following information: the red cells numbered 4,100,000 and the white cells 11,400 per cubic millimetre, the hæmoglobin value was 86%, the colour index was 1·0. Of the leucocytes, 54% were polymorphonuclear cells, 44% were lymphocytes and 2% were eosinophile cells.

An X-ray examination of his bones (Figures II and III) was made, and this again revealed the precise nature of the condition—namely, multiple myelomatosis. His urine contained the Bence-Jones protein. The radiologist's report is as follows:

> The radiographs show multiple rounded areas of rarefaction with accompanying gross osteoporosis. The pelvis and ribs show the distinctive appearance better than any other bones—"pea" sized areas are also seen in the humerus and scapula. Spontaneous fracture may occur and in this case there is a collapse of a lumbar vertebra.

Here again confusion, particularly in the early stages, was caused by the fact of his having had a previous attack of "lumbago" and by the absence of any objective findings other than the complaint of pain. It is well to remember that in this disease 70% of patients complain of pain in the lumbar and sacral regions; in the final stages the pain is recurrent and progressively more intense. Deep X-ray therapy is the most valuable form of treatment in bringing about symptomatic improvement.

Case III.

The case of Mr. H.V., aged sixty-three years, the last of these three case reports, is recognized as one of the old "snares" in medicine. The patient was referred with a diagnosis of infective arthritis and was very debilitated indeed. He had a great deal of pain, and whilst he was in hospital for three or four weeks both passive and active movement of any limb became increasingly difficult, the greatest of pain being caused. There was also a failure of general health, which was associated with this intense pain. His complaint was of pain affecting all parts of the body; but the main sites were the lumbar region and both shoulder girdles. There was also pain in the muscles with a sensation of "boring" in the bones. There were no joint swellings, but any movement was exquisitely painful. A blood count gave the following information: the red cells numbered 2,780,000 and the white cells 6,800 per cubic millimetre, the hæmoglobin value was 60% and the colour index was 0·9. Of the leucocytes, 62% were polymorphonuclear cells, 31% were lymphocytes, 2% were monocytes, 4% were eosinophile cells and 1% were basophile cells.

The skiagram (Figure IV) reveals exactly the cause, namely, a generalized carcinomatosis. The radiologist's report is as follows:

> Generalized carcinomatosis—the pelvis and spine showed generalized metastases of the osteoplastic type (some of the involved structures are so dense as to be called ivory).

The patient had a large, nodular, malignant prostate, but had no urinary symptoms whatever. It is worthy of note that the bones of the pelvis are amongst the first to show evidence of metastasis, especially from the prostate, thyreoid, breast and suprarenals.

Conclusions.

1. It is prudent always to pay strict attention to the history of a patient who complains of rheumatism. In all these cases full questioning revealed quite wide variations from the general rheumatic symptomatology, although superficial resemblances were present in all three.
2. It is essential in all such cases to use radiological aids to diagnosis, for none of these cases would have been correctly evaluated without it. As the pelvis is one of the commonest bones involved in these diseases, the need of X-ray examination to aid in early diagnosis is paramount.
3. The exhibition of Lugol's iodine is a great alleviative of the pain in a large percentage of cases of *osteitis deformans*. In fact, one physician has remarked that for the pain of this distressing malady iodine is to Paget's disease as morphine is to most others. The more general use of this drug in this condition is therefore recommended.

Acknowledgement.

I am indebted to Dr. G. Mason for the preparation of the accompanying illustrations and radiological reports.

Reviews.

THE DOCTOR IN AIR RAIDS.

IN the second edition of their book "Medical Organisation and Surgical Practice in Air Raids", Philip Mitchiner and E. M. Cowell have improved upon the previous publication by the introduction of fresh material gained from recent experiences in Great Britain.[1] The early chapters are devoted to a detailed description of the methods employed by the British Government to cope with the heavy casualties to be expected from indiscriminate bombing of open towns and cities. It seems that a vast organization has been set up, has been sorely tried, and has not been found wanting. The casualty services including the first-aid parties are the responsibility of the Ministry for Home Security, whilst the first-aid posts, hospitals and ambulance trains are under the Ministry of Health.

The major part of this valuable handbook is concerned with general principles in the surgical treatment of war casualties; and this is a subject upon which the authors are eminently qualified to express a sound opinion. The knowledge they have to impart has been acquired in the tranquil surroundings of field hospitals during the last war; from a visit to the battlefields of Spain; and from a practical application of the surgical art on the battlefields of Britain.

One statement is stressed with dogmatic insistence: that the best surgical skill available becomes hopelessly ineffective in large-scale air attack if the casualty services are not properly organized and efficiently directed. In the same way, plans must be made far ahead for mass production methods to be applied in emergency hospitals in order to ensure smooth reception and early treatment of those suffering from severe multiple injuries.

It has so far been our good fortune to be spared the horrors of heavy aerial bombardment on account of our remoteness from enemy bases; but that does not absolve us from the need to prepare for possible eventualities in the near future. The information and advice so meticulously set out in these pages might well be considered by surgeons and general practitioners whose spehere of activity may some day lie in this direction.

[1] "Medical Organisation and Surgical Practice in Air Raids", by P. H. Mitchiner, C.B.E., T.D., D.L., M.D., M.S., F.R.C.S., and E. M. Cowell, C.B., C.B.E., D.S.O., T.D., D.L., M.D., B.S., F.R.C.S., with a foreword by Sir Cuthbert Wallace, Bt., K.C.M.G., C.B., F.R.C.S.; Second Edition; 1941. London: J. and A. Churchill. Large crown 8vo, pp. 305, with 1 colour plate and 58 illustrations. Price: 12s. 6d. net.

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POLIOMYELITIS.

EVEN medical practitioners are apt to forget that the depredations of acute anterior poliomyelitis are numerically insignificant beside those of pertussis, measles or scarlet fever. The disabilities produced by it, however, are so obvious that a discussion on its treatment or its pathogenesis always attracts attention. The subject is of absorbing interest; it has been explored by many workers and though certain facts have been determined, it cannot be said that we have anything like a complete picture of the pathogenesis. Interest cannot be allowed to flag, for epidemics succeed one another with monotonous regularity, being sometimes severe and sometimes not so severe; and in point of fact epidemiologists and pædiatricians tell us that we may expect another epidemic in Australia at the end of this year and the beginning of next. There is thus every reason why medical practitioners should become familiar with every new advance in knowledge as it is made. Recent research in virus distribution in fatal cases of poliomyelitis has, it would seem, led us further along the road to complete understanding and it is to this work that attention is now directed.

Working under the ægis of the National Foundation for Infantile Paralysis in the United States of America, Albert R. Sabin and Robert Ward have studied the natural history of human poliomyelitis. Details of their investigation of the distribution of virus in nervous and non-nervous tissues are given in *The Journal of Experimental Medicine* of June 1, 1941, and they were discussed by Sabin in relation to the whole question of the ætiology of poliomyelitis at the annual meeting of the American Medical Association in June last. Sabin's discussion at this meeting forms part of a symposium published in *The Journal of the American Medical Association* of July 26, 1941. The investigation consisted of a search for the virus of poliomyelitis in a large number of tissues from the bodies of human patients who had recently died from the disease. Eleven careful autopsies were made and samples of tissue were taken under sterile conditions from different organs and systems that they might be examined for the presence of virus. In two instances an incorrect diagnosis had been made, for no virus was found. In the other nine autopsies tissues were removed from all parts of the nervous system, the sympathetic system, the tonsils and pharyngeal wall, salivary glands, lymph glands of the axilla and groin, liver, spleen, kidney, lung, ileum and descending colon (the contents were treated separately from the wall), and the nasal mucosa. All the patients had died of bulbar paralysis and had had various degrees of spinal involvement. Some of the findings were constant and apparently of considerable significance. In no instance did emulsions from the olfactory bulbs, the anterior perforated substance, the frontal cortex or the occipital cortex yield virus. On the other hand virus was obtained from the diencephalon, the bulb or the spinal cord in every case and as a rule from more than one of these regions. The pharyngeal mucosa yielded virus in four of seven cases. Virus was present in the contents of the descending colon in every one of six cases in which contents were available; it was present in the washed wall of the descending colon in only one instance. Virus was present in the washed wall of the ileum in three cases and in the contents in two. In one instance virus was recovered from the abdominal sympathetic ganglia; none was recovered from the salivary glands, mesenteric glands or nasal mucosa; with one exception the lymph glands did not contain virus.

The first thing that will strike readers about this work is the failure to discover virus in the olfactory bulb. Readers will remember that about four years ago a great deal was written regarding the use of zinc sulphate as a prophylactic when applied to the olfactory region. E. W. Schultz and L. P. Gebhardt reviewed the subject in *The Journal of the American Medical Association* of June 26, 1937 (see THE MEDICAL JOURNAL OF AUSTRALIA, August 21, 1937, page 318), and J. M. Dwyer contributed an article to this journal on the subject in November, 1938. According to Sabin, what led to the view that the olfactory pathway was the most probable natural portal of entry of the virus in man was the observation that experimental poliomyelitis developed most regularly in monkeys when the virus was instilled into the nose and the olfactory pathway was available for its progression to the nervous system, and that, on the other hand, rhesus monkeys could swallow or receive by stomach tube large amounts of virus without contracting poliomyelitis. Many investigators have questioned the validity of the hypothesis that the olfactory region is the portal of entry in man. This has been partly due to the failure of prophylactic olfactory treatment to give adequate protection to man and partly to the absence of lesions in human olfactory bulbs that would indicate that they were portals of entry. The work of F. M. Burnet, A. V. Jackson and E. Graeme Robertson, published in 1939 in *The Australian Journal of Experimental Biology and Medical Science*, is important in this regard. These observers produced poliomyelitis in cynomolgus monkeys by swabbing virus onto the throat or tongue and by feeding which excluded the olfactory pathway. Sabin refers to this work and also to the observation of H. A. Howe and D. Bodian that chimpanzees contracted poliomyelitis on being fed with virus contained in human stools after their olfactory tracts had been

severed. The work of Sabin and Ward points to the entire alimentary tract as the site of attack by the poliomyelitis virus and supports the view suggested by the work that has been cited, that the olfactory pathway has no part in the establishment of the disease. That Sabin found no evidence of centrifugal spread of virus and that the virus in one instance was present in the abdominal sympathetic suggest that the virus may pass by a nervous pathway from the intestine to the spinal cord. The constant finding of virus in the colon may offer an explanation for the preponderance of lower limb paralysis in poliomyelitis. At the meeting of the American Medical Association Sabin painted an interesting picture of human poliomyelitis which he put forward purely as a working hypothesis; he quite rightly insisted that as new knowledge is accumulated his hypothesis will either have to be modified and extended or completely abandoned. He visualized the virus entering the human body by the mouth and establishing itself throughout the alimentary tract where it proceeded to multiply. The virus then, he thought, might be visualized as beginning its invasion of the central nervous system essentially along two pathways: one leading into the medulla by way of the cranial nerves supplying the upper part of the tract, or by way of the parasympathetic system along the vagus from the lower part, and the other leading into the spinal cord either along the visceral afferent fibres through the spinal ganglia or along the visceral efferent fibres from the intestine by way of the abdominal sympathetic ganglia. If the greater attack and spread of the virus are along the first pathway, Sabin thinks that a syndrome may be expected in which bulbar signs are primary; if the second pathway is more predominantly affected the primary paralysis would be in the extremities. The inapparent or abortive type of case would be one in which either virus multiplication is limited to the alimentary tract, or the virus also invades the central nervous system but fails to destroy a sufficient number of nerve cells to give rise to clinical signs.

Sabin's hypothesis has been built up on the observations made by himself and Ward and will be accepted by most workers with hopeful interest. The observations have not been numerous and it is to be hoped that others will confirm and extend them. In our reading of them we must remember that Sabin himself insists that he has formulated an hypothesis and nothing more. One conclusion that can be drawn is the paramount importance of early diagnosis and of rest in the early treatment, that the virus be not encouraged to violent destruction of nervous tissue. Another, already stated, is that clinicians should follow the new developments in poliomyelitis research, and this for the reason well expressed by a leading Australian pathologist that the uninformed observer is a dangerous observer, especially when he is dealing with pædiatric conditions.

Current Comment.

UNABSORBABLE SUTURE AND LIGATURE MATERIALS.

WHILE the majority of surgeons are conservative and have no desire "to be the first on whom the new are tried", the reluctance of some surgeons to use unabsorbable materials for the reason that they are recent innovations and new-fangled ideas has a false basis. Cotton and horse-hair were used as ligature materials as early as 500 B.C., and since then many other unabsorbable materials have been used, but of those which have stood the test of time the most popular now are silk, cotton, linen and metal wire. With the advent of antiseptic and aseptic surgery ligature and suture materials became of greater importance, but unfortunately most surgeons have followed the lead of Lister who favoured catgut and condemned silk and other unabsorbable materials on the grounds that they predisposed to infection. Later, with the casting of doubt on the sterility of catgut, a small but steadily increasing band of surgeons, especially in United States of America, have renounced catgut for one of the unabsorbable materials.

The use of fine metal wire as a ligature material is interesting. Many types of metal have been used, but the most popular now is stainless steel wire which was introduced by W. W. Babcock.[1] The advantages claimed for it are that it is easily manipulated, it has great tensile strength, very fine material may be used, it produces a minimal tissue reaction with no staining of the tissues, it is inexpensive and easily sterilized, and there is said to be no production of post-operative discomfort from the buried sutures. If such were true it would appear that fine stainless steel wire fulfils all the requirements of a perfect suture and ligature material; it would also then appear to be especially useful in acute abdominal emergencies in the presence of tension and increased tissue friability, and when infection is likely to occur and general debility to be present. When steel wire is used it is important to prevent pain from being caused by the wire ends by being careful not to kink the wire, by cutting the ends close to the knot, and by flattening wherever possible. Attention has been drawn by D. J. Preston[2] to the extreme variability noted in the diameter of samples of catgut and to a less extent in the diameter of samples of silk, while there is only slight variability in the diameter of samples of steel wire. Since the diameter is an important factor in the determination of tensile strength, the greater the variability in the diameter of a suture, the less reliable and constant will be its tensile strength. The fear of implanting unabsorbable material in the tissues dates from those days when continuous silk sutures were used and sinus development was common. The use of fine interrupted silk sutures with the ends cut short has for practical purposes completely eliminated the complication of sinus development due to the silk *per se*. Such ideas die slowly, for there is still no doubt that a similar fear would be in the back of the minds of most surgeons if steel wire were used for suture and ligature materials. To overcome this theoretical difficulty J. Verbrugge[3] has described an alloy of 92% magnesium and 8% aluminium which is gradually absorbed over a period of four to six months. This alloy has been used for deep tension sutures; it is said to be non-toxic and to accelerate callus formation when used as bone screws or plates. Such an innovation should have a more general appeal to the timid surgeons, but further proof of the non-toxicity of this material and of the ease with which it may be handled is both necessary and important.

Those surgeons who look on catgut as the ideal suture and ligature material should remember that apart from the difficulty in obtaining sterility with catgut there are other disadvantages in its use. Among these are the excessive tissue reaction and exudation which occur and which delay wound healing, the fact that after seven days there is sometimes no evidence of even chromicized gut after its use in wounds, and that a sensitivity to catgut has been shown to be present in some instances. In addition, wound disruptions are most common between the fourth and eighth days after operation, that is, when the catgut has become weak and there has been insufficient time for fibroblastic strengthening of the wound to develop. The suggested replacement of animal and vegetable suture and ligature materials by metal wire is in keeping with the general trend towards mechanization wherever possible. Some surgeons will probably condemn it on these grounds

[1] *American Journal of Surgery*, Volume XXVII, 1935, page 67.
[2] *Surgery*, June, 1941, page 896.
[3] *La presse médicale*, Volume XLII, 1934, page 460.

alone, but when such glowing reports of the results of its use appear in the literature further investigation and trial of this material are necessary.

"BUT SOFT, WE ARE [MASS] OBSERVED."

MASS observation seeks to obtain direct information on public opinion concerning matters of greater or less moment. The information culled by this technique is positive and objective, and should afford a more reliable guide to public reaction than the politician's reputed flair for "sensing" public trends. Mass observation has been employed largely in England by Harrison and his colleagues, especially on occasions of importance. The workers recorded—unknown to the speakers, and verbatim as far as possible—the public conversations of all classes of people in all sorts of situations. The conversations recorded were afterwards analysed according to subject; the results were interesting and often disconcerting. In the United States "straw votes" and Gallup polls have been in use for many years. The method is to address a *questionnaire* on some important subject to a number of individuals representative of public thought. Thus, while mass observation tries to evaluate the total mental content of the public, "straw votes" and the like direct attention to some particular subject. In both cases the value of the data gleaned depends upon the number of observations and the extent to which they are truly representative of the community as a whole.

In Australia, until recently, nobody has bothered much about gaining direct access to the public mind; apparently it has been enough to be wise after the disappointment which follows a misreading. Within the last few months newspapers have promised "straw votes" on various subjects; meanwhile, A. P. Elkin, Professor of Anthropology in the University of Sydney, has done something in the matter.[1]

Professor Elkin's method comprises both "straw vote" and mass observation; "straw vote" from the point of view that a *questionnaire* was used, mass observation in the personal contact effected by a number of trained observers encouraged to elicit opinions on related subjects. Unfortunately, the number of observations is not large; Professor Elkin is not very explicit here, but there do not appear to have been many more than 500. These are from New South Wales only, representing approximately $^1/_{40}\%$ of the population, or $^1/_{120}\%$ of the whole of Australia. On the other hand, the individuals and groups were selected from "Sydney, Newcastle, eight country towns of various types and sizes and centres of different industries, and a few country districts, and within each of the regions contact was made with individuals of various 'classes', professions, trades *et cetera*, and ages". Thus the figures, if small, are widely representative, and it is possible that larger figures might have given similar results. The results, in any case, are all that we have, and they are of considerable interest. They cannot be discussed fully here, but a few of the more outstanding facts might be considered briefly.

In the first place the author deals with the oft-repeated charge of apathy towards the war effort. Some real apathy certainly appears, but only in about 7% of the opinions expressed; other reasons must be sought for the apparently widespread air of indifference. Among these are disillusionment, disgust with politics and politicians, mistrust of propaganda, the feeling that Britain is sure to win, or that this war is not Australia's affair. And of course the truly poor, struggling to keep large families on a minimal income, are not likely—with an anxious eye on the rising cost of living—to feel any great enthusiasm about the war. Secondly, the author points out that the view that the youth of the country "are not doing the thinking just now" is without foundation. The evidence reveals that they are thinking, and thinking hard and seriously, about the war; but their thought is not necessarily in support of the national war effort. The younger members of the community have gained their education since the last war, with the emphasis upon peace, and a general "debunking" of all the factors associated with that war; the attitude of youth towards the present war is a logical outcome of that teaching. Only in those who derived their education and opinions before or during the last war is the preponderance of thought along the lines which the Government would wish (it will be recalled that the army has complained that too many recruits are older men—married, with children—and too few are young and single). Among trades unionists there appears to be strong belief that this war will benefit only the politicians and profiteers; and as late as June of this year 36% of the delegates to the Trades Unions Congress in Melbourne "were prepared to reduce or stop Australia's war effort".

The survey covers the various media for disseminating news and views to the public—radio, newspapers, church and public meeting. As far as the radio is concerned, some 70% of people listen to the news more or less regularly—but not all with undivided attention. And while some 60% discuss what they hear, only about 20% profess to be influenced by it; and this is true even of many actively engaged in voluntary war work. It is interesting to note that with very few exceptions radio commentaries and political speeches are decidedly unpopular. It is also of interest that some 14% of all males and 42% of all females suffer from "nerves" induced by the war news. The main complaints about the radio are its impersonality, its monotonous repetition of stale news—much suspect of being "doctored", and the lack of spontaneity and sincerity in the appeals which are made.

In respect to newspapers, only 13% of all males and 20% of all females profess to believe what they read. The great majority accept what is reported with reserve, and only some 20% confess to being stimulated to action by the news. Many mistrust what is reported, having in mind misleading reports in the past; they suspect bias or misrepresentation, either accidental or from wilful self-interest.

The Church today appears to have little influence upon public thought, since the majority deny that they are moved by its appeal.

The results, as far as they go, are decidedly interesting; certainly they must disconcert those whose position depends upon public opinion. If these results have any significance, past attempts to influence that opinion must be confessed an ignominious failure, especially when 77% of males state that their attitude towards the war is uninfluenced by the news. The reasons for this failure are discussed by Professor Elkin and should be read in the original, but one factor stands out above all others—mistrust: mistrust of the news, mistrust of propaganda, mistrust of vested interests, mistrust of profiteers, and, above all, mistrust of politicians. As Professor Elkin points out, this last attitude is both illogical and dangerous. Illogical because the professed aim of the majority is to maintain the democratic constitution, with election of the leaders; dangerous because it divides attention when the united effort of the country is most urgently needed.

This book is certainly thought-provoking. It provides for the first time objective data on what the people of Australia think, and is thus one of the most important of recent publications. The lines of public thought may be wrong, but these lines will determine the attitude of the country as a whole towards the national war effort and may have a considerable effect upon its outcome. It is obvious, too, that the present methods of attacking public opinion have been almost wholly fruitless, and that they must be revised if any success is to accrue. The book should be read with care and thoroughly digested by every politician, particularly when it is noted that the recent swing to Labour in New South Wales is attributed by Professor Elkin largely to the votes of those under thirty; the book should be read by every person who is concerned in any way with moulding public opinion; it will be read by those who take an intelligent interest in their fellow countrymen. For the first time we have some definite facts by which to judge our national attitude; it is urgently necessary to accumulate more of these facts without delay—the results may have an important bearing upon the future of the country as a whole.

[1] "Our Opinions and the National Effort", by A. P. Elkin; 1941. Sydney: Australasian Medical Publishing Company, Limited. Demy 8vo, pp. 80. Price: 2s. 6d. net.

Abstracts from Medical Literature.

SURGERY.

Hydatid Cyst of the Liver.

JOSE ARCE (*Archives of Surgery*, June, 1941) describes some of the clinical forms of hydatid disease of the liver, with special reference to the treatment. Of these liver cysts, 85% occur in the right lobe and only 15% in the left lobe. Central hydatid of the right lobe causes a generalized enlargement of the liver suggesting hypertrophy of the parenchyma. If the cyst is peripheral, the shape of the liver is altered by protrusion of the cyst backwards or forwards, downwards or upwards. Associated with hydatid disease there is always a compensatory hypertrophy of the unaffected portion of the liver. This hypertrophy may be most marked in the left lobe, and in this case care must be taken not to mistake the hypertrophy for a cyst in the left lobe, which is relatively uncommon. A cyst on the posterior aspect of the right lobe is related to the kidney and must not be mistaken for a renal tumour. In the surgical approach the cyst is reached by the shortest route between skin and cyst. Thus for anterior tumours a mid-line or paramedian laparotomy may be used. The author favours a transverse incision. The rectus sheath and muscle are divided transversely, and the lateral abdominal muscles are separated in the lines of their various fibres. The advantages claimed are that the incision is relatively small, though adequate, and exposure is good, allowing the cyst to be dealt with easily. Also, if necessary, this incision can be easily and safely enlarged either across the mid-line or in a lateral direction. Subsequent hernia formation, it is stated, is not favoured. For cysts of the anterior part of the upper surface a transdiaphragmatic parapleural approach is used. After resection of a portion of a suitable rib with its costal cartilage and the corresponding portion of the costo-chondral margin, the reflection of the pleura is mobilized upwards and backwards and the diaphragm is divided to expose the upper surface of the liver. For cysts of the posterior portion of the upper surface, access is through a transpleural transdiaphragmatic incision after resection of eight or ten centimetres of the ninth rib between the mid-axillary and scapular lines. The edges of the diaphragmatic incision are sutured to the muscle of the superficial wound. Pneumothorax and pleural contamination are thus avoided. For cysts on the posterior part of the inferior surface a transverse horizontal incision is made in the flank; the incision starts on the right twelfth rib and ends in front at the mammary line. The author discusses in detail the method of dealing with the various types of cyst which may be encountered. He points out that if marsupialization is used for a cyst undergoing considerable calcification, a fistula persists for months or even years, until the whole of the calcified material is eliminated. This exposes the patient to all the risks and inconveniences common to chronic fistulæ. In these cases, therefore, he recommends that operation should be withheld unless symptoms are causing major inconvenience, or if the cyst is small and peripheral in position, that the cyst should be enucleated with the calcified adventitia, and the bleeding controlled by gauze packing. The author points out that, apart from such cases, the total enucleation of a cyst from the liver is, in his opinion, unthinkable.

"Simple" Ulcers of the Caecum, Colon and Rectum.

D. BARLOW (*The British Journal of Surgery*, April, 1941) discusses simple ulcers of the large bowel, and adds two personal cases to the 78 which he was able to collect from the literature. Pathologically these ulcers resemble chronic peptic ulcers. They occur most frequently in the caecum and ascending colon, but also in the sigmoid. The appearances seen suggest, as a rule, that an ulcer has been present for some time. The edges are often thickened and even cartilaginous in consistency. There is frequently a superadded acute process, and perforation commonly occurs. Of the right-sided ulcers 66% and of the left-sided 81% had already perforated when first seen. Diagnosis is difficult, and it appears that no case has yet been diagnosed with certainty prior to operation. The most common diagnosis made is one of appendicitis in some form. Treatment depends on the stage which the process has reached. If the ulcer has perforated, oversewing and drainage of the peritoneal cavity may be successful; of nine patients so treated, seven survived. When simple drainage was performed, all died. When the area affected is extensive, exteriorization and later opening of the area may be performed. Where the ulcer has not yet perforated, it is probable that resection of the affected segment and lateral anastomosis are the best procedures. In other cases a local excision of the ulcer with suture of the defect and drainage of the pelvis has succeeded, even in the presence of perforation and general peritonitis. Diagnosis is the main difficulty, and at present appears almost impossible. In the majority of cases, however, the patient had sufficient symptoms to justify laparotomy. Even when the abdomen was open, several cases were considered to be examples of malignant disease. It is suggested that barium-air contrast radiography may be of help in suspected cases.

Spontaneous Internal Biliary Fistula.

COMMUNICATIONS have been reported between the biliary tree and practically every organ in the chest, abdomen and pelvis. E. L. Eliason and L. W. Stevens (*The American Journal of Surgery*, February, 1941) find that the commonest type is one between the gall-bladder and the duodenum. Next comes the colon and then the stomach. Such communications usually follow chronic calculous gall-bladder disease, but may be secondary to peptic ulcer or gastro-intestinal cancer. The diagnosis of the fistula is usually made at operation or autopsy. The symptoms are usually those of the associated gall-bladder disease. But the vomiting of large stones or their passage in the fæces is strong presumptive evidence of a fistula. The fistula may not remain open, and the only evidence found later may be dense adhesions between gall-bladder and bowel. Large gall-stones passed into the small bowel in this way may pass with the fæces, but they are liable to cause intestinal obstruction. Characteristically, this obstruction is intermittent and incomplete at first, later becoming complete. In practically all cases the stone is found within two feet of the ileo-caecal valve. A pre-operative diagnosis of the cause of the obstruction is occasionally made if the significance of the previous gall-stone history is appreciated. But this is not always possible, as the recorded cases show that in many, if not the majority, of cases there is no history suggestive of previous gall-bladder disease. In a few instances a pre-operative diagnosis is made by X-ray examination, an opaque stone being shown in the lower part of the abdomen. The presence of a fistula between gall-bladder and bowel may also be shown by X-ray examination, air being seen in the bile passages. Or barium may enter these passages following a barium meal. It must be remembered, however, that barium may occasionally pass into the biliary tract through the papilla of Vater without the presence of a fistulous communication. The author reports five cases of internal biliary fistula which demonstrate many of the points discussed by him.

Benign Stricture of the Bile Ducts Treated with a Vitallium Tube.

H. E. PEARSE (*Surgery*, July, 1941) reports three cases in which benign strictures of the common bile duct were treated by anastomosis over metal tubes. The tubes used were made of vitallium metal, as it was found experimentally that this substance is practically unaffected when immersed in human bile for long periods, and when implanted in the bile passages of laboratory animals. In view of the fact that the metal is well tolerated, the tubes were designed to remain permanently in position and were constructed with a small projecting lug at its midlength shaped to be held at the line of anastomosis. The author concludes that the use of these tubes is indicated in extensive biliary strictures which appear irreparable by other methods.

Malignant Melanoma of the Mouth.

MALIGNANT melanoma of the mouth is an uncommon condition, but one of some clinical interest. H. Baxter (*The American Journal of Surgery*, February, 1941) has been able to trace 54 cases in the literature. Like carcinoma of the tongue, this is a disease of middle life, most common in males. It is rare in coloured races. More than 90% of the tumours were on the superior alveolar ridge or the palate. The patients usually noticed the tumour in the mouth, but a few complained only of a swelling in the neck, which was due to metastases. The tumour being soft and vascular, hæmorrhage was frequently noted. Pigmentation is usually, but not always, pronounced. Metastases occur by the lymphatics, in contrast to the blood-stream spread which is so common a feature in the ocular melanomata. Secondary deposits may or may not be pigmented. The degree of pigmentation appears to have no relation to the malignancy, which is of a very variable order. Among the conditions to be considered in differential diagnosis may be mentioned the pigmented plaques seen in the mouth at times after vigorous treatment with bismuth. Regarding treatment, only 2% to 5% of malignant melanomata

respond to irradiation. Furthermore, rapid generalization may occur after this method of treatment. Other methods, such as the use of Coley's fluid, cobra venom and colloidal lead, have not proved encouraging. Surgery seems to offer the best hope. Glandular drainage is to the supramandibular, submaxillary and superior deep cervical glands, and if the tumour is situated posteriorly, to the retropharyngeal glands. The last-mentioned are almost inaccessible to surgery. The author considers that if the tumour is small and the glands are not palpable, it may be justifiable to remove the tumour locally by electrocautery and to watch the drainage area for signs of deposits. In all other cases radical block dissection of glands of the neck should be performed. The prognosis is poor, but should be capable of improvement by early diagnosis and radical surgical removal. In only a few of the reported cases has such radical surgery been performed.

Common Duct Stones.

J. H. WOOLSEY (*The Western Journal of Surgery, Obstetrics and Gynecology*, May, 1941) states that more than 20% of cases of cholecystitis and cholelithiasis may be complicated by stone in the common bile duct. Common duct stones may be gall-bladder stones which have migrated from the gall-bladder into the duct, or they may form in the duct. Examples of the latter are the stones associated with hæmolytic jaundice. It has often been noted that, following cholecystectomy, the common bile duct enlarges. It is suggested that the common bile duct may assume some of the functions of the gall-bladder in these cases. The author also thinks that the inflammatory changes in the mucosa of the gall-bladder which lead to the formation of stones may spread to the common bile duct and lead to a similar occurrence there. All stones, therefore, which are found in the common bile duct following removal of the gall-bladder are not necessarily overlooked stones. Mention is made of Lahey's experience of repeated stone formation in the ducts following cholecystectomy. In the clinical findings some emphasis is laid on the constant and marked complaint of nausea. Experimental work has shown that if intraductal pressure is raised severe nausea occurs, whereas a rise of pressure in the gall-bladder causes pain and not nausea. Of the chemical investigations, the estimation of icterus index during periods when symptoms are present has been invaluable. This may show a rise in the absence of jaundice. A high percentage of patients with common duct stones have never been jaundiced. The absence of a history of jaundice does not, therefore, relieve the surgeon of the necessity of exploring the common duct. Palpation and visual examination of the duct may lead to erroneous conclusions. In any doubtful case, when, for example, induration of the head of the pancreas obscures the condition at the lower end of the duct, exploration should be undertaken. The added risk in most cases is not great, while the consequences of an overlooked stone may be most serious. In performing the exploration it is often an advantage for the surgeon to stand at the left side of the table. Confirmatory aspiration of the duct should be performed prior to its incision. Instrumental dilatation of the sphincter of Oddi, carefully performed, is probably a wise procedure. Transduodenal approach to the papilla may be necessary, and if the opening is carefully closed no untoward results follow. Drainage of the duct should be by a T-tube. Cholangiography should confirm a free passage into the duodenum before the tube is removed.

Adhesions from Hot Laparotomy Pads.

F. R. KREDEL AND H. G. SMITHEY (*Surgery*, July, 1941) present the results of experimental work on the tendency of hot laparotomy pads to favour the occurrence of peritoneal adhesions. Pads wrung out of sterile water at varying temperatures were applied to the abdominal viscera of dogs, which were later sacrificed and examined. It was found that pads applied at temperatures of 45° to 50° C. were, in most animals, followed by the development of adhesions. The authors point out that estimation of the temperatures of sponges by the hand is unreliable, owing to the insulating effect of rubber gloves. Thus a pad at 45° C. does not feel warm at all, and a pad at 50° C. merely comfortably warm if held for about fifteen seconds. Only above 55° C. are painful sensations produced. Even when the hands are plunged into hot liquid the gloves delay and diminish the appreciation of heat. The authors believe that hot pads constitute a fertile cause of abdominal adhesions. They are not convinced, further, that pads at room temperature are likely materially to influence the onset of shock, and consider that their use would be preferable. They particularly deprecate the common practice of applying hot sponges to recently strangulated loops of bowel in an attempt to examine their viability.

Acute Pancreatitis.

THE ætiology of acute pancreatitis is still a riddle. According to G. K. Rhodes (*The Western Journal of Surgery, Obstetrics and Gynecology*, May, 1941) rational treatment will not be standardized till this riddle is solved. Chemical or infective agents, or both in combination, may initiate the process in the pancreas. These may reach the gland by lymphatics from the diseased biliary tract, which is so often found with acute pancreatitis. In other cases ascending infection along the ducts seems undoubtedly to have occurred. In yet others a blood infection may occur, as in the pancreatitis associated with mumps. Recent work suggests that in some cases there is hyperplasia of the mucosa lining the larger pancreatic ducts, leading to obstruction, with distension and rupture of acini. Urinary diastase estimations have been widely used in recent years as an aid to diagnosis, but the author considers that blood amylase readings may be more reliable and may reveal changes earlier than the urinary diastase. Large groups of patients were used as controls, but high readings were found only in those cases in which the clinical picture was consistent with acute pancreatitis. It was found that the test was most valuable in the early hours of onset of the disease. After the early stages, amylase readings were found to fluctuate, and twenty-four hours later might even be subnormal. Hence repeated tests are recommended. Experience in a series of 35 cases led the author to agree with an increasing number of competent observers that conservative treatment is the method of choice in the acute stages of the disease. Direct attack on the gland is meddlesome and harmful. Disease in the biliary tract should be corrected at a later date.

Torsion of an Appendix Epiploica.

DAVID LE VAY (*The Lancet*, February 1, 1941) describes a case of chronic torsion of an epiploic appendix of the sigmoid colon. The possibility of the presence of chronic disease of a sigmoid appendix should be suggested by the isolated symptoms of pain in the left iliac fossa in a patient of middle age. The pathological affections of the *appendices epiploicæ* may be mechanical (torsion and its sequelæ) or inflammatory, and either may be acute or chronic. Abscess formation or even general peritonitis may arise, and adhesions to neighbouring bowel may form. Pain is the only constant complaint, there being no constant clinical picture, and the usual diagnoses are acute appendicitis, acute diverticulitis, acute salpingitis, twisted pedicle of an ovarian cyst and acute cholecystitis. A suggestive radiological sign is that of spasm but no evidence of diverticulosis. Death is rare and is due in fatal cases to ileus or peritonitis. In the acute and uncomplicated case the treatment consists of the simple removal of the appendage.

Visualization of the Interior of the Common Duct.

M. A. MCIVER (*Surgery*, January, 1941) describes an instrument which permits the inspection of the interior of the common bile duct at operation. The instrument, like a cystoscope, has a telescope and also illuminating and irrigating systems. The author claims that it is useful in locating stones and in confirming their complete removal.

The Medical Management of Fractures.

CHARLES F. NELSON AND ROLAND C. NELSON (*The Journal of the American Medical Association*, January 18, 1941) offer suggestions as to the medical management of fractures. They base their remarks on the study of 1,000 fractures with primary union, several cases of delayed union, and animal experiments. Serum calcium and serum phosphorus estimations are carried out immediately after fracture, and treatment is instituted to establish a serum calcium concentration of from 10·5 to 12·0 milligrammes and a serum phosphorus concentration of from 3·5 to 4·0 milligrammes per 100 cubic centimetres, with a final ratio of 3:1. To increase the calcium a diet rich in calcium is commenced, calcium gluconate is given by mouth and intravenously (with hydrochloric acid if necessary), and intravenous injections of parathyreoid extract are given. To increase the serum phosphorus content a diet rich in phosphorus is given and also vitamin *D* in carefully calculated doses. Of all the patients with fracture, 856 had a low serum calcium content, whilst only 25% had a low serum phosphorus content. In cases of osteoporosis the basal metabolic rate is estimated and any patient whose rate is below +10% is given thyreoid extract. Since the establishment of accurate medical management the authors have not had a failure in union of fresh fractures, and many referred cases of delayed union have reacted favourably to treatment.

British Medical Association News.

SCIENTIFIC

A MEETING of the New South Wales Branch of the British Medical Association was held on August 21, 1941, at Broughton Hall Psychiatric Clinic. The meeting took the form of a number of clinical demonstrations by members of the staff.

Congenital Syphilis.

The first patient shown was an unmarried female, aged seventeen years. Both her parents were alive and well; one brother, aged twenty-one years, was alive and well, and one sister had been stillborn. The patient had a normal birth and infancy, and walked and talked at the usual time. In childhood she suffered from chickenpox, measles, pertussis and scarlet fever. She attended school from the age of six to the age of fourteen years; in the early years she was an average scholar, passing the primary final examination at the age of twelve and a half years and going on to a domestic science school. From about that time her mother noticed that the patient seemed drowsy. She underwent an operation for appendicectomy, and when she returned to school a change was noticed in her. She did no good at her lessons, and in fact regressed to such an extent that at the time of the meeting she could scarcely write her name. She became destructive, and tore up her books and scribbled on them. She grew dirty and slovenly, and her mother noticed that she was unsteady on her legs and used frequently to fall over. The unsteadiness seemed to extend to her hands, so that she was clumsy and inefficient in her efforts to help with the housework. Her teeth decayed rapidly and she had had them all extracted by the age of fifteen and a half years. As she did not begin to menstruate at the usual time she was given a course of ovarian injections; the menstrual periods began at the age of fifteen years and nine months.

The patient was quiet, childish in behaviour and not difficult to manage; she had never had convulsions or fits of any kind. On her admission to hospital she was amenable and quiet, but infantile, crying and laughing without much cause. She could give her name, age, address and date of birth correctly, and also some information about recent happenings at home; her memory for recent events was fairly good, but her memory for remote events was poor. She could read, understood questions and obeyed commands, but lacked the power of concentration; her attention wandered easily. She was unable to tell a coherent story. Her speech was indistinct; she could not pronounce many simple words correctly. Her only interests were toys, birthday presents *et cetera*. She was normally developed for a girl of her age, except that her hands and feet were very small. The face was asymmetrical, the left side appearing slightly weaker than the right. The pupils were unequal and irregular; the left was slightly larger than the right, and both reacted sluggishly to light. The knee jerks and ankle jerks were present, and the plantar reflex was flexor in type. She was clumsy with her hands, but did not exhibit pronounced ataxia. Her gait was unsteady, but true Rombergism was not present. Sensation was difficult to estimate, because of the patient's lack of concentration; but no gross abnormality was detected.

The prognosis in this case was considered bad. The condition was one of mental deficiency determined by congenital syphilis. Treatment could be expected only to arrest any further progress of the girl's disease, but would in no way improve her mental status.

General Paralysis of the Insane.

A number of patients were shown who were suffering from general paralysis of the insane in various forms. The first was a male patient, aged forty-five years, a school teacher, who was married and had three children. His disease was arrested. He had been admitted to Broughton Hall on August 13, 1936, with a history of a penile chancre in 1916, for which he had received little or no treatment. He was rambling and garrulous, gave a poor account of himself, had an impaired memory and was confused. At that time the systolic blood pressure was 180 millimetres of mercury and the diastolic 100; the pulse rate was 100 per minute. The vessels were papable and the heart was enlarged. The Wassermann, Kline and Boas tests produced positive reactions with the patient's blood serum. The cerebro-spinal fluid also reacted to the Wassermann and Takata-Ara tests, and the curve produced by Lange's gold sol test was "5555554100"; the fluid contained cells and an increased amount of globulin. The patient was given a course of malarial therapy and had eleven rigors in August and September, and was treated with tryparsamide. He was discharged from hospital on December 7, foolish and fatuous, but well physically.

On April 29, 1937, further examinations were carried out with the cerebro-spinal fluid. The Wassermann and Takata-Ara tests still produced reactions; the curve produced by Lange's gold sol test was "5442210000" and the fluid still contained an increased amount of globulin and cells. The treatment given to the patient was summarized in the following terms: (i) malarial therapy, 11 rigors in August and September, 1936; (ii) 100 hours' treatment with the inductotherm between December, 1938, and January, 1939, the temperature being raised above 103° F.; (iii) treatment with tryparsamide: 14 grammes from May to July, 1937, 30 grammes from March to May, 1938, 30 grammes from July to September, 1938, 30 grammes from April to June, 1939, and 30 grammes from November, 1939, to February, 1940. During that period the blood serum and cerebro-spinal fluid gradually ceased to react to any of the tests. On August 6, 1941, the patient was mildly demented, but could perform many useful tasks; his disease seemed to be thoroughly arrested.

The next patient was suffering from general paralysis of the insane in the ataxic form. He was a married man, aged forty-six years, with no children and no occupation. He gave a history of primary chancre at the age of sixteen years, for which he was treated by a pharmacist. He had always been healthy and a good worker until two years prior to the meeting, when he suddenly found that his right leg refused to act when he was in town one day. He was, however, able to walk with help, and he did not seek medical aid because he could eat and drink well. In a few months his gait became more ataxic, the right leg being the more feeble; his condition was much worse in the dark. The right hand then became involved, and he was able to write only with difficulty. A year before the meeting he became mentally dull, his power of concentration became poor and he lost his interests. A medical man instituted a course of "Novarsenobillon" and bismuth injections, but no improvement in the patient's condition followed. Then he was treated by a chiropractor, but without improvement. He became sleepy, carefree, irresponsible and forgetful; he lacked insight and believed his condition was improving. At the time of the meeting he was not at all concerned at his serious predicament. On April 15, 1941, the Wassermann and Kline tests produced a reaction with the patient's blood serum, but the Boas test did not; the Wassermann and Takata-Ara tests produced reactions with the cerebro-spinal fluid, and the curve produced by Lange's gold sol test was "5543310000"; the fluid contained increased amounts of globulin and cells. The patient could not concentrate, and had poor memory for recent events and periods of confusion; he was dull, his speech was thick and slurred, he lacked insight, and he was euphoric, showing all the signs of early dementia.

The patient was a middle-aged man of heavy build. His systolic blood pressure was 110 millimetres of mercury and his diastolic pressure 70. The pulse rate was 110 per minute. Certain sounds were slurred in his speech. He was ataxic and showed pronounced incoordination with spasmodic movements. The tongue and facial muscles were tremulous. The pupils were equal and reacted to light and accommodation. The knee jerks were absent on the right side and the plantar reflexes were of doubtful type. The patient was hallucinated for voices and vision and had delusions of a persecutory nature; at times he exhibited restless and threatening conduct. He was having treatment with tryparsamide and a course of injections of "T.A.B." vaccine.

The third patient suffering from general paralysis of the insane was an unmarried man, aged forty-one years, by trade a dental mechanic. He had been admitted to Broughton Hall on June 11, 1941, with a history of "giddy turns". There was nothing of importance in his family history, and his early life was uneventful. He had served in the war of 1914-1918, going overseas at the age of eighteen years. He admitted promiscuous sexual intercourse in Egypt, and said that he had "the arsenic treatment" there. He also contracted dysentery and malaria. He followed the trade of dental mechanic and did fairly well. It appeared that for ten years past he had been showing signs of mental change, being at times restless, irritable and irresponsible. Recently he had had a delusion that his bed was full of men, and he had become inhibited mentally and slow in action; for example, he took over two hours to shave himself. He had an obsession for cleanliness and spent hours washing himself; but for the last days before the meeting he had been listless and disinclined to do anything. His power of concentration was bad; he was dull and inhibited and had begun to have mild persecutory delusions. He lacked initiative and ambition and had lost his interests; his

memory for recent events was poor, and he lacked insight and showed all the symptoms of early dementia. The Wassermann, Kline and Boas tests all produced positive reactions with the patient's blood serum; the Wassermann and Takata-Ara tests produced positive reactions with the cerebro-spinal fluid, and the curve produced by Lange's gold sol test was "5543211000". The fluid contained an increased amount of globulin and cells.

The patient was a thin man with a dull expression. The systolic blood pressure was 144 millimetres of mercury and the diastolic 84; the pulse rate was 98 per minute. Slight ataxia of the legs was noted; no Rombergism was present, but there was some loss of power in the lower limbs. The pupils were equal and round and did not react to light; but they showed the correct actions of accommodation. The knee jerks were exaggerated on both sides. The plantar reflex on the left side was indeterminate. Tremors of the lips were present, and fine and coarse tremors of the tongue were noted. The patient was put in a single room because he was restless. Treatment consisted of injections of tryparsamide, one per week, and a course of "T.A.B." vaccine treatment.

The fourth patient suffering from general paralysis of the insane had the expansive type of the disease. He was an unmarried seaman, aged forty years, whose early life had been uneventful. He had been at sea since the age of eleven years, and denied having had a primary chancre. About nine months prior to his admission to Broughton Hall he began to suffer from insomnia; he became restless and walked about at night, smoked incessantly and had periods of confusion; he forgot all recent events and lost his personal possessions. A speech difficulty of the nature of dysarthria developed, and he had twitching of the mouth and tremor of the hands. He was discharged from his ship because of physical and mental disability. He began to have the delusion that he was a good singer and offered his services to a commercial broadcasting station; then he became impulsive and threatened his landlady. He became euphoric and grandiose about his voice, which he held was alto, although in reality it was described as "bull-like". He denied that he had ever associated with Bacchus or Venus, and a portrait of himself that he executed depicted him as a nautical angel. He lacked insight and showed dementia. The blood serum failed to react to the Wassermann, Kline or Boas test. The cerebro-spinal fluid yielded a positive reaction to the Wassermann and Takata-Ara tests, and the curve produced by Lange's gold sol test was "4331100000". The fluid contained an increased amount of globulin and cells. The patient had been treated for rheumatism for a year; he had several X-ray examinations and a course of gold injections.

Examination revealed him to be a tall, fair-haired man, with a systolic blood pressure of 159 millimetres of mercury and a diastolic pressure of 90; his pulse rate was 70 per minute. His arteries were thin and wiry. Tremors were present in all limbs; the facial muscles were tremulous, and fine and coarse tremor of the tongue was noted; his speech was slurred. On his admission to hospital his pupils reacted normally. The knee jerks were much exaggerated on both sides. The plantar reflexes were flexor in type, and the abdominal and other reflexes were normal. The patient had a painful rheumatic condition of his hip joint. He was treated with tryparsamide, one injection per week, and a course of treatment with the inductotherm lasting for 100 hours.

The final patient suffering from general paralysis of the insane was an Italian, aged forty-six years; he had two children and was a fisherman by trade. The disease was of the paretic type. He had had a primary chancre in 1918. For the past two years he had been complaining that his head felt empty and that he was unable to think. During that period he had been able to do casual work only, and at the time of the meeting even that was beyond him. He had no delusions, but was quiet and depressed, sitting with his head in his hands. At times he displayed temper and hit his head with his closed fists. He was lacking in power of concentration, his memory for recent events was poor, and he could not, even in Italian and with an interpreter, carry on a sensible conversation. He was disorientated for time and place, lacked interest and was dull and apathetic. Even his memory for remote events was failing, and he showed a considerable degree of dementia. The patient was a small, dark man, with a vacant expression. The systolic blood pressure was 128 millimetres of mercury and the diastolic 82; the pulse rate was 90 per minute. The blood vessels were healthy. The pupils were irregular in shape, and the reactions to light and consensual reactions were doubtful. The knee jerks were sluggish on both sides and the plantar reflexes were flexor in type.

In July, 1941, the patient was inoculated with malaria parasites; he was treated with tryparsamide, one injection per week. The blood serum failed to react to the Wassermann, Kline or Boas test. The cerebro-spinal fluid reacted to the Takata-Ara test.

It was pointed out that the classical type of general paralysis of the insane—the expansive, euphoric type—was relatively rare. The common type was one of simple dementia without any striking psychotic symptoms. The dementia was the immediate consequence of the destruction of cortical neurones. If psychotic symptoms, such as hallucinations or delusions, were present, then they had to be regarded as release phenomena. It was possible now to guarantee with some confidence to arrest general paralysis of the insane by adequate treatment, which involved arsenic therapy, preferably with tryparsamide, and pyrexial treatment, which could be secured by inoculation with malaria or by electrical means. Clinical improvement with respect to mental symptoms followed quickly on the commencement of pyrexial therapy. The serological improvement, on the other hand, came much more slowly. In the experience of the medical staff at Broughton Hall about three years were required before a complete serological cure could be claimed. What the ultimate mental condition of the patient would be depended upon the degree to which the organic changes in the cortex had progressed before treatment was initiated. That fact emphasized the great importance of early diagnosis in cases of neurosyphilis. It was a mistake to depend entirely upon the result of the Wassermann test as applied to the blood serum in the diagnosis of general paralysis of the insane. In all cases in which there was any reasonable suspicion that the nervous system might be involved, the cerebro-spinal fluid should be examined. Finally, it was of interest to remark that general paralysis of the insane was considerably less common than it had been twenty years earlier. That fact might reflect the benefits accruing from better treatment of primary syphilis, or it might follow a falling incidence of syphilitic infections generally.

Cerebral Syphilis.

Two patients suffering from cerebral syphilis were shown. The first was a married man, aged fifty-two years, with four children. He was a case-maker by trade. One brother had committed suicide seven years earlier, and three sisters had died of valvular heart disease at the ages of twenty-four, twenty-six and twenty-seven years. The father was an alcoholic, and he had brutally ill-treated the patient. The boy had got into bad company and had stolen and drunk to excess; he was libidinous and boasted of it. In April, 1941, the patient had a stroke, which left him with defective speech, a slightly hemiplegic gait and weakness of the right hand. In addition, his memory became weak, his power of concentration failed, and he became depressed and lachrymose and gave up his usual interests. He was quite confused. He had precipitate micturition and suffered from constipation; he was careless and untidy in his habits, and had the delusion that someone had burnt down his factory three times in a year. Actually, the factory was burnt down, but the cause of the fire was explained. He was disorientated for time and place. The blood serum reacted to the Wassermann, Kline and Boas tests; the cerebro-spinal fluid reacted to the Wassermann and Takata-Ara tests, and the curve produced by Lange's gold sol test was "4554433210". The cerebro-spinal fluid contained an increased amount of globulin and cells.

The patient was a small grey-haired man, older than his years. The systolic blood pressure was 98 millimetres of mercury and the diastolic 70. The pulse rate was 90 per minute. There was an aortic systolic murmur, and some nodules and atheroma were detected in the radial arteries. Motor coordination was defective on the right side. The pupils did not react to light nor give the consensual reaction, and their reaction to accommodation was doubtful. The knee jerks were much exaggerated on both sides; the plantar reflexes were flexor on both sides; the abdominal and epigastric reflexes could not be elicited. The patient was being treated by injections of tryparsamide, one per week, and on July 21, 1941, he had been inoculated with malarial parasites.

The second patient suffering from cerebral syphilis was an unmarried male, aged thirty-nine years, a taxi-cab driver. He gave a history of primary chancre at the age of twenty-two years, and was discharged from a naval hospital as cured. About six years prior to the meeting he was medically examined before marriage and the syphilitic disease was again discovered to be active. He then had several years' treatment without any change in the reaction of the blood serum to the Wassermann test. In 1940 he began to experience dimness of near vision, buzzing in the ears and difficulty in speech. He had worked up to a few weeks before the meeting. He had had no difficulty in walking, but was nervous and tremulous. He had noticed failure of memory for recent events, and mislaid articles. He was unable to concentrate, was easily fatigued and had

lost his usual interests. The blood serum reacted to the Wassermann, Kline and Boas tests. The cerebro-spinal fluid gave a "slight positive" reaction to the Wassermann test and reacted to the Takata-Ara test; the curve produced by Lange's gold sol test was "3210000000".

The patient was not thin. His face and lip muscles were tremulous. The systolic blood pressure was 184 millimetres of mercury and the diastolic 100; the pulse rate was 112 per minute. Systolic and diastolic murmurs were audible at the aortic valve. The pupils were irregular in shape, but reacted to light and accommodation. The right knee jerk was present, but the left was absent; the abdominal reflexes were absent. He was treated with inductothermy and weekly injections of tryparsamide, and his condition greatly improved.

Puerperal Depressive States.

Several patients suffering from puerperal depressive states were shown. The first was a married woman, aged thirty-four years; she was one of twins born prematurely, at seven months' gestation, and the mother had had albuminuria during pregnancy. The patient was a delicate child; she had pneumonia and empyema at the age of five years, typhoid fever at the age of fifteen years and scarlet fever at the age of twenty-seven years. She had been well during the first six months of pregnancy, and then albuminuria developed rapidly, with increasing hyperpiesis and œdema. A Cæsarean section was performed in March, 1941, but the child was dead when delivered. On her return home the patient was depressed and emotional; she had ideas of unworthiness, grieved over the loss of the child, felt hopeless of ever being well again, and made three attempts at suicide.

On her admission to Broughton Hall on June 21 she was depressed, emotionally unstable, restless and agitated; she expressed ideas of inferiority and hopelessness for the future. Examination of the urine revealed the presence of albumin. The systolic blood pressure was 160 millimetres of mercury. Treatment with "Phrenazol" was begun, and the patient began to show improvement after the first two injections. She was brighter, interested in her surroundings and energetic, but still rather emotional and restless.

The second patient in the group was suffering from a post-puerperal anxiety state. She was a married woman, aged twenty-nine years; one brother and one sister had died of pulmonary tuberculosis; the mother had died of cancer. The patient had two children, aged respectively three and a half years and three and a half months. She had had three miscarriages. During the last few weeks of the second pregnancy the patient became irritable, depressed and tired; no physical abnormalities were detected. She had a normal labour and was in hospital for eleven days. While she was in hospital the patient felt confused, could not think clearly and worried because she felt she was becoming insane; she asked to be taken to Broughton Hall on her return home. Her family did not appreciate her condition and she was taken for a holiday; her condition did not improve and she had suicidal tendencies, which she restrained with the greatest difficulty. She could not be bothered doing anything, and worried about her inability to work; she had hysterical outbursts.

On her admission to Broughton Hall she was depressed and over-emotional; she could not help crying, lacked energy and interest, and was confused; but she had good insight into her condition and said that she felt better than twelve weeks earlier. During her stay in hospital her condition had improved; she was brighter and more interested in her appearance and felt well; but she was still rather indecisive, lacking in concentration and emotionally unstable.

The third patient of the group was a married woman, aged thirty-five years. She had had measles and mumps in childhood. She had two children, aged respectively five years and three months, and had had two miscarriages between the two children. The patient said that she was well during the latter part of her pregnancy, but depressed and very tired. She had a normal labour on April 25, 1941. She returned home in two weeks, and one week later a breast abscess developed. She became depressed, restless and unable to content herself anywhere; she wanted to leave hospital, went to her mother's home and then was readmitted to hospital. She fed the baby herself for one month, but the child lost weight, and lactation was unsatisfactory, so artificial feeding was introduced. The patient became obsessed with the idea that people would think she was neglecting the baby and starving it. She had a series of breast abscesses; four incisions were necessary in the left breast and one was made in the right breast. Her mental state became worse, and she had delusions of persecution, slept poorly and expressed suicidal ideas.

On her admission to Broughton Hall on June 28 she looked very ill; the skin and mucous membranes were pale. The temperature was 99° F. and the pulse rate was 120 per minute. One incision on the left breast was discharging, but the others had closed. There was no vaginal discharge. The uterus appeared to have involuted normally, and examination of the urine revealed no abnormality. She was depressed, restless, anxious, emotionally unstable and retarded; her memory was confused, she had delusions of persecution and was obsessed with ideas of her own unworthiness. She was disorientated for time and place and was unable to give a coherent history.

The fourth patient in the group was a married woman, aged thirty-two years. She had previously had only measles and pertussis. She was a healthy, cheerful, placid young woman, with one child. Pregnancy, labour and convalescence had all been normal. On returning home the patient had some difficulty with lactation; mastitis developed, and the baby did not gain weight satisfactorily and finally had to be artificially fed. The patient was much worried over this; she became depressed, lost interest in everything, and felt unable to cope with the housework and the care of the child; she became emotionally unstable and cried at any irritation. Her depressed condition had been present for six months.

On her admission to Broughton Hall her physical condition appeared good. She was depressed and lacked interest and concentration; she had good insight into her condition, but had ideas of unworthiness and was rather hopeless regarding the possibility of improvement. Treatment with "Phrenazol" was begun, and the patient became brighter and more hopeful.

It was pointed out in connexion with this group of patients that puerperal psychoses were unfortunately rather common and that they occurred chiefly in *primiparæ*. There seemed to be an element of predisposition, in that the mothers were usually relatively young and rather of a dependent type. When the baby came they felt inadequate and became over-anxious and perplexed; an acute depressive or confusional reaction might then develop. Puerperal psychoses were psychogenic conditions. Not often was there an organic or toxic element; but if these were present, then typical confusional states were found. It had been noticed at Broughton Hall that in the latter class of case, when the organic element had cleared up there was a tendency for the psychogenic element to persist. The prognosis in puerperal psychosis had been dramatically altered for the better by the introduction of convulsant shock therapy. Previously the prognosis for life and recovery was good; but the duration of the puerperal psychosis was prolonged, averaging from twelve to eighteen months. Convulsant shock therapy had shortened this period to an average of about three months.

Epileptic Psychosis: Post-Puerperal Exacerbation.

A female patient, aged twenty-four years, suffering from a post-puerperal exacerbation of an epileptic psychosis, was shown; the patient was a married woman and had one child. She had been knocked down by a motor car at the age of eleven years and had been suffering from epileptiform seizures since the age of twelve years. She had been treated at the out-patient departments of two large metropolitan hospitals and had been twice examined radiologically at another. She had had little education and was dull and bad-tempered. She had had albuminuria during the last three months of the second pregnancy; the baby was born three months before her admission to Broughton Hall and lived only two weeks. Since the birth of the child the patient's mental condition had become steadily worse; she was retarded and lacked interest and energy. She was unable to look after the first child, aged eighteen months; she did not keep her clean and did not appreciate the necessity for protecting her from ordinary dangers—for example, she would leave the child out on the footpath alone. Everything the patient did was badly done. She had major epileptiform seizures, always at night and at irregular intervals. Since her admission to Broughton Hall she had been sullen, irritable, noisy, abusive and aggressive at times; she had no insight into her condition and was quite uncooperative in her treatment. She was dirty and careless of her appearance, and at times destructive.

It was pointed out that the case illustrated how an epileptic psychosis might be precipitated by pregnancy.

Masculine Protest.

A female patient, aged seventeen years, was shown; the patient was unmarried. Her mother was mentally unstable and probably difficult in the home; she had twice been certified insane. The patient was the eldest of four children. In childhood she had suffered from gastro-enteritis, measles and chickenpox. At school she was an

average scholar. On leaving school at the age of fourteen years she learned millinery for one year. She easily grew tired of things and was self-willed and bad-tempered in the home and quarrelsome with the other children. One year prior to her admission to Broughton Hall she went to a station in the country, where she was to be a companion in the house and be trained in agricultural work. Soon after her arrival various peculiarities of behaviour were noticed. Ever since her childhood she had expressed the wish to be a boy. While she was at home she had from time to time gone away into the bush for a day dressed in male attire; on one occasion she was taken back by the police. While she was in the country she liked the outdoor work, but did not like housework, and would go out into the paddocks and hide if visitors arrived. During the last six months she was rude and difficult to manage and argued about everything, so that her employer wished to send her home. She obtained another position in another country district, but objected to doing housework and went out rabbit trapping. Since her return home she had repeatedly asked to have some treatment to change her into a boy; her asocial tendencies and peculiarities of behaviour had become more pronounced. She went readily to Broughton Hall, because she had heard of injection treatment and hoped that it would bring about the desired change of sex. She resented her feminine figure and felt that it interfered with her obtaining the work she wanted. As a child she played with boys and still preferred their companionship in the same way; she did not want a "boy friend" like other girls. During her stay in hospital she had been quiet and amenable.

Huntington's Chorea.

A male patient, aged forty-nine years, suffering from Huntington's chorea was shown. He was a retired civil servant, married, with two children. His mother died at the age of fifty-six years; she had had Huntington's chorea and had spent some time in Broughton Hall. The patient's maternal grandmother also had died of Huntington's chorea, two uncles were similarly afflicted, and his sister had the complaint in a severe form. The patient had been quite normal mentally and physically until 1936, when he began to lurch when walking, began to talk too freely and became hesitant in decisions and unduly irritable and unreasonable. The condition advanced slowly, and in 1938 he could no longer perform his office work and also showed the movements peculiar to his complaint. The disease progressed. At the time of the meeting he walked with difficulty, fed himself slowly and swallowed food noisily, ever-emphasizing the motions of chewing. He was garrulous, carefree and irresponsible, with lucid intervals during which he showed good intellectual flashes. He dozed a considerable amount during the day, had given up his interests and no longer cared for the newspaper or wireless programme. He had lost the power of proper concentration, his memory for recent events was poor and he showed an advancing degree of dementia. He was unable to dress or shave himself.

Physical examination showed the patient to be thin; his skin was of an unhealthy tint and his face lacked expression. His systolic blood pressure was 112 millimetres of mercury and his diastolic pressure 80; the arteries were healthy. The power of coordination was bad, and severe choreic movements of the limbs and face were present, with increasing weakness of motor action due to debility. His movements were quite strong at times, but were irregular and objectively purposeless, and the facial movements in particular were pronounced. He made gesticulations of clumsy and bizarre type known as parakinesis. The movements of choreic nature were made worse by effort or any excitement. His mental and physical condition was slowly becoming worse; but he was an amenable and pleasant patient.

It was pointed out that Huntington's chorea was relatively common in mental hospital experience in New South Wales. For example, the family of the patient shown had provided nine or ten patients for mental hospitals. The family history also illustrated the tendency of Huntington's chorea towards antedating; it had sometimes been observed in adolescents and young adults, and in that case the course of the disease was very rapid. It was interesting to contrast the experience in New South Wales of the frequency of Huntington's chorea with experience in Germany. For instance, one authority had stated that on the Continent Huntington's chorea (hereditary progressive chorea) was rare. On the other hand, he found that chronic progressive chorea unassociated with a family history was more common.

Sydenham's Chorea.

A female patient, aged twenty-two years, suffering from Sydenham's chorea, was shown. The patient was unmarried. Her father had died from heart disease in 1940, and one sister had chorea. The patient had had measles in childhood, rheumatic fever at the age of fifteen years, and rubella in 1940; in February, 1940, she had undergone thyreoidectomy for rapidly developing thyreotoxicosis. Her present illness had begun in November, 1940; the patient became dyspnœic on exertion and could not walk even a short distance without becoming exhausted. Her medical attendant advised three weeks' rest in bed because of her cardiac condition. Since the beginning of 1941 she had worked for only one week, in January. She then seemed tired and listless and would not go to any entertainment, preferring to "have a rest". During February and March she was in and out of bed. Towards the end of March her mother noticed a change in her mental state; she became delusional and hallucinated, and had ideas of reference. She was admitted to a metropolitan hospital on April 5. Towards the end of her first week in hospital she became restless and began to throw herself about, making irregular, purposeless movements, and grimacing and shaking her head. Mentally she was confused, and talked incoherently most of the time.

On her admission to Broughton Hall on April 22 she was restless, making frequent choreiform movements of the head, hands and body. She was conscious, but confused, and unable to fix her attention for more than a few seconds; she had auditory and visual hallucinations and delusions of persecution; she was disorientated for time and indifferent to her surroundings. Her articulation was so indistinct that it was difficult to understand her, and her conversation was disjointed and degenerated into an incoherent mumble after the first few minutes. The patient was thin and debilitated, and appeared very ill. The joints of her hands were swollen and painful, and pronounced tenderness was present over the upper cervical spines; she kept her head turned to the right. She had an erythematous rash over both sides of the chest, the buttocks and the groins. Examination of the heart disclosed that the apex beat was diffuse; the heart sounds were rapid and irregular (the pulse rate was 108 per minute), and systolic and diastolic murmurs were present in the mitral area. The tonsils were large and inflamed. The patient exhibited irregular twitching movements of the face and choreiform movements of the hands.

For several weeks the patient's restlessness increased, her choreiform movements became more violent and her mental confusion became worse. It was impossible to keep her in bed; she rolled about on the floor, which was covered with mattresses. She was given "Luminal", one grain four times a day, and her condition had improved during the five or six weeks preceding the meeting. She was no longer delusional or hallucinated, and could converse reasonably, though she was rather childlike in speech and manner. She had gained in weight and was not dyspnœic on ordinary exercise, such as walking about the ward and surroundings; the choreiform movements had ceased except for occasional twitching of the head and face.

It was pointed out that the patient provided the typical clinical picture of Sydenham's chorea; she had been shown for comparison with the patient suffering from Huntington's chorea. She had shown the characteristic confusional psychosis in association with the chorea; this was manifested by definite hallucinations and delusions. It was interesting to note that the patient's mental state had improved *pari passu* with her physical improvement.

(To be continued.)

Medical Societies.

THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA.

A MEETING of the Medical Sciences Club of South Australia was held at the University of Adelaide on June 6, 1941.

The Electrical Recording of Heart and Lung Sounds.

DR. KARL J. POSENER presented an account of some collaborative work on which he had been engaged in connexion with the electrical recording of heart and lung sounds. Dr. Posener stated that auscultatory phenomena were sound mixtures of quite different amplitudes and frequencies. It was still impracticable to get every component of such a mixture equally true into a single sound curve, for elements of higher intensity were liable to obscure those of lower sound pressure. Several differently tuned amplifiers were therefore used for the all-comprising graphic representation of the acoustic phenomena concerned.

The peculiar frequency dependency of the human ear in the appreciation of intensities near the threshold of audibility led to errors in auscultation. Deceptions of this kind could be clarified in the way of objective recordings.

The origin of the first and second and also of fluid heart tones was discussed on the basis of the main frequency ranges of these tones. Heart murmurs and the vesicular type of respiratory murmurs were in all probability dependent upon the proper frequencies of the vibratile systems involved.

The method employed also offered in many cases information about the elasticity of vascular walls.

Artificial Hybridization of Yeasts.

MR. L. S. WALTERS contributed a paper entitled "The Artificial Hybridization of Yeasts". He gave an account of some recent work carried out by Winge and Laustsen at the Carlsberg Laboratories on the germination and conjugation of yeast spores. By means of the micromanipulator these workers had been able to separate the individual spores from a single ascus of yeast and to cultivate them separately in droplets of culture medium.

When single spores of two different species of yeast were placed in mutual contact in a drop of medium, it had been found that sometimes both spores germinated simultaneously and formed a hybrid spore zygote which subsequently budded and gave rise to vegetative cells of a hybrid yeast. In this manner Winge and Laustsen produced a dozen or more hybrids. In general, the hybrid yeasts were intermediate in character between the parental types. They exhibited the effect of heterosis, or increased vegetative vigour, which was a property of hybrids in general. Although the hybrids readily formed spores under suitable conditions, the germinating power of the spores was extremely low (2% or less).

It was stated that at least one hybrid yeast was employed commercially in England for the production of bakers' yeast, while others were undergoing trial in breweries in Europe.

Naval, Military and Air Force.

APPOINTMENTS.

THE undermentioned appointments changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 210, of October 23, 1941.

NAVAL FORCES OF THE COMMONWEALTH.

Permanent Naval Forces of the Commonwealth (Sea-Going Forces).

Extension of Appointment.—The appointment of Surgeon Lieutenant Clive Laurence Statham is extended for a period of two years from 23rd January, 1942.

Citizen Naval Forces of the Commonwealth: Royal Australian Naval Reserve.

Appointment.—Graeme Lindsay Grove is appointed Surgeon Lieutenant, dated 26th September, 1941.

AUSTRALIAN IMPERIAL FORCE.

Australian Army Medical Corps.

To be Colonel.—Lieutenant-Colonel D. C. Pigdon, E.D., relinquishes the command of an Australian Convalescent Depot and is appointed to command an Australian General Hospital, 1st September, 1941.

To be Lieutenant-Colonel.—Major R. M. W. Webster, M.C., and is appointed to command an Australian Convalescent Depot, 1st September, 1941.

To be Majors.—Captains J. F. J. Cade, J. S. Chalmers, I. T. Cameron and J. J. Searby, 1st September, 1941.

To be Majors.—Honorary Captain R. C. E. Brodie and Ewan Murray-Will, 8th September, 1941.

To be Captains.—Captains D. J. M. Dunn, 18th September, 1941; and R. C. Johnston, 1st September, 1941; and Honorary Captain J. E. D. Crozier, 18th September, 1941.

To be Captains.—Honorary Captains B. A. Baker and A. E. Gribble, 8th September, 1941.

Colonel H. C. Disher, C.B.E., from Assistant Director of Medical Services of a Division, to be Assistant Director of Medical Services of an Armoured Division, 1st August, 1941.

Captain D. A. Alexander is transferred from Reinforcements, 6th August, 1941.

The undermentioned officers are transferred to Reinforcements from the dates shown: Captains A. M. Barron, 15th September, 1941, and J. P. Higgin, 1st September, 1941.

Captain J. A. Bassetti is transferred from "Voyage Only" duties with regimental seniority in accordance with Army seniority, 4th September, 1941.

To be Colonel (temporarily).—Lieutenant-Colonel J. C. Belisario, 3rd August, 1941.

To be Lieutenant-Colonels (temporarily).—Majors A. L. Dawkins, T. Y. Nelson and K. C. Ross, 3rd August, 1941.

To be Majors (temporarily).—Captains R. J. Humphery, A. M. Macintosh and A. A. Moon, 3rd August, 1941, and A. F. James and E. L. Corlette, 5th August, 1941.

Major W. Park relinquishes the temporary rank of Lieutenant-Colonel, 13th August, 1941.

AUSTRALIAN MILITARY FORCES.

PERMANENT MILITARY FORCES: AUSTRALIAN ARMY MEDICAL CORPS.

The appointment of Captain (Temporary Major) W. V. Russell in the Permanent Military Forces is terminated, 22nd October, 1941, and he is transferred to the Australian Army Medical Corps, Citizen Military Forces, in the rank of Captain, 23rd October, 1941, and remains seconded.

CITIZEN MILITARY FORCES: AUSTRALIAN ARMY MEDICAL CORPS.

Northern Command.

First Military District.

To be Honorary Captain.—John Berry Moffatt, 8th September, 1941.

Q184624 Honorary Major W. H. Smith is appointed from the Reserve of Officers (A.A.M.C.) and to be Captain (provisionally) and retains the honorary rank of Major, 26th July, 1940 (in lieu of the notifications respecting this officer which appeared in Executive Minutes Nos. 93/1941 and 120/1941, promulgated in *Commonwealth Gazettes* Nos. 105 and 136 of 1941, respectively).

To be Honorary Captains.—James Vincent Hynes, 19th September, 1941; and George Crowley Taylor, 22nd September, 1941.

Eastern Command.

Second Military District.

To be Captain (provisionally).—Archibald Maclean Harper, 10th September, 1941.

To be Honorary Captain.—Charles Hutcheon Thomson, 10th September, 1941.

To be Captain (provisionally).—Ewan Murray-Will, 7th September, 1941.

Southern Command.

Third Military District.

To be Captains (provisionally).—Gordon Graham Calder McKenzie, Ian Archibald Neil McCallum, Lindsay Frederick Irwin, Frederick Roy Phillips, Louis Binney Witts, Ian Arthur Wilson, Francis Joseph McCoy, Douglas Roy McFarlane, David Henry Waterworth, James Richard McCoy, Maurice Maxim Gooey, Donald Joseph Dowling, Walter Gottfried Miller, John Charles Mullany, 12th September, 1941, and John Maurice Davies, 15th September, 1941.

To be Honorary Captains.—John Terence Cahill, Henry Roy Clegg, William Allan McKay, Maurice Vivian Clarke, Alan Gordon Nicholson, Alexander Lindsay Thom, Donald James Oldmeadow and Michael Mark O'Brien, 12th September, 1941; James Hamilton Smith, 13th September, 1941; and William Thomas Greening, Ivo Paul Beattie and Peter Hannay Davis, 15th September, 1941.

Honorary Captain C. E. Backwell is appointed from the Reserve of Officers and to be Captain (provisionally), 14th July, 1941.

To be Captain (provisionally).—Karl Neilson Uhd, 15th September, 1941.

To be Honorary Captain.—Alan Robert Tate, 12th September, 1941.

Fourth Military District.

To be Honorary Captains.—Alexander Roy Magarey, Friedrich Berthold Leditschke, Lansell Bonnin, Walter Hooper Baudinet, Frederick Andrew Dibden, Peter Gerald Jay, Paul Reuben James and Ronald Vernon Southcott, 12th September, 1941; and Richard Akhurst Goodhart, 16th September, 1941.

Major N. S. Gunning is appointed to command a Cavalry Field Ambulance and to be Lieutenant-Colonel (temporarily), 8th September, 1941.

Western Command.

Fifth Military District.

The resignation of Honorary Captain W. G. Norman of his commission is accepted, 8th September, 1941.

ROYAL AUSTRALIAN AIR FORCE.

Citizen Air Force: Medical Branch.

Flight Lieutenant D. Barry is granted the acting rank of Squadron Leader whilst employed in a Squadron Leader post with effect from 1st October, 1941.

Temporary Squadron Leader C. H. Hembrow is granted the acting rank of Wing Commander whilst employed as a Wing Commander with effect from 1st September, 1941.

The following Flight Lieutenants are granted the acting rank of Squadron Leader whilst employed as Squadron Leaders with effect from the dates indicated: R. G. Morris, 25th August, 1941; A. N. Poulton, R. G. Tonkin, 29th August, 1941.

Flying Officer H. J. R. Gamble is granted the acting rank of Flight Lieutenant whilst employed as a Flight Lieutenant with effect from 26th June, 1941.—(Ex. Min. No. 146—Approved 22nd October, 1941.)

Reserve: Medical Branch.

The following are appointed to commissions on probation with the rank of Flight Lieutenant with effect from 8th September, 1941: Wilson Leighton Corlis, M.B., B.S., James Lesslie Pollock, M.B., B.S.—(Ex. Min. No. 145—Approved 22nd October, 1941.)

CASUALTIES.

ACCORDING to the casualty list received on November 3, 1941, Lieutenant-Colonel L. E. Le Souef, A.A.M.C., of South Perth, Western Australia, and Captain A. G. G. Carter, A.A.M.C., of Toorak, Victoria, are reported prisoners of war. Captain A. J. King, A.A.M.C., of Victoria Park, Western Australia, Captain W. G. Holt, A.A.M.C., of King's Cross, New South Wales, Captain K. J. J. Dorney, A.A.M.C., of Elwood, Victoria, previously reported missing, are now reported believed prisoners of war.

Correspondence.

FUNGOUS INFECTION OF THE FOOT.

SIR: The work of Linn and Magarey (THE MEDICAL JOURNAL OF AUSTRALIA, October 18, 1941) appears effectively to dispose of the prevailing notion that most, if not all, interdigital skin lesions of the foot—soft corns and the like—are fungous or mycotic in origin.

In the *Proceedings of the Staff Meetings of the Mayo Clinic*, Volume XV, Number 35, August 28, 1940, there appears an article by H. B. Macey on "The Etiology and Treatment of Soft Corns", which might be of interest to Colonel A. R. Southwood and his officers. Macey clings to the colloquial term "soft-corn" as being best suited to his ideas on the nature of the condition. "These corns usually occur between the fourth and fifth toes but may be found between any two toes, depending on the presence of certain mechanical factors." He illustrates how pressure on bony prominences of the proximal phalanges may arise from improper boots or shoes. A simple osteotomy is practised for cure. In short, the condition is regarded as orthopædic and not dermatologic.

Yours, etc.,

ROBERT FOWLER.

14, Parliament Place,
Melbourne, C.2,
October 25, 1941.

Obituary.

HARRY CLARENDON WHITTLE.

HARRY CLARENDON WHITTLE, whose death was recently announced in these pages, was born at Quirindi, New South Wales, on September 2, 1898. His father, Louis Clarendon Whittle, recently deceased, had a pharmacist's business in the town. Louis Whittle was a well-read man of philosophic nature, and it was from his father that Harry Clarendon Whittle inherited that love of literature which was such a marked trait in his character.

Young Whittle attended the public school at Quirindi, and there he showed even at a young age that prowess in running and football in which he was to excel later at the secondary school. At this early age he had a love of Nature which he maintained throughout his life. He became an excellent amateur ornithologist, there being few birds of which he did not know the habits. He also interested himself later in life in photography. His tutors at this primary school fostered his love of Nature, and he eventually decided to enter the medical profession. From Quirindi Public School, Whittle went to Barker College, Hornsby, New South Wales. His scholastic career was creditable, his name always appearing among the prize winners. In his final year at school he won the character medal awarded to the boy who best illustrated in his life what a "Barker boy" should be. In athletics and football he played a prominent part. His best race was the mile. In 1914 he became the school captain in football, leading his team to victory on many occasions. In the school cadet corps he held non-commissioned rank, and in the corps he showed that conscientiousness and thoroughness which were characteristic of everything he attempted.

He sat for his matriculation examinations, and in December, 1914, he said farewell to school and entered Saint Paul's College at the University of Sydney to study medicine. Throughout his university career he continued to play football. He represented his college in the inter-collegiate football matches, but was not successful in winning a "blue". In 1920 he graduated as Bachelor of Medicine and Master of Surgery. For some time after his graduation, Whittle was attached to the Royal Alexandra Hospital for Children, Sydney, as a resident medical officer. Subsequently he went to Croydon, Queensland, where he practised his profession for a little over a year. On April 3, 1922, he married Miss Thelma Dowe, of Tamworth. Four children were born of the marriage, three of whom survive. Mrs. Whittle was an able helpmate to her husband, always supporting him in his many public activities.

After their marriage Harry Clarendon Whittle and his wife went to Maryborough, Queensland, where in the first months of the year 1922, Whittle began a career of useful activity, which was to terminate only with his departure for the war front in 1940. He began his medical career in Maryborough by being a partner with the late Dr. Lee Garde, but on the death of the latter Whittle determined to have an independent practice. He had not practised long before he showed a leaning to radiography. His purchase of a modern X-ray apparatus was a great boon to Maryborough, as the plant was always at the disposal of the other medical practitioners of the town. He later became medical officer of the municipality of Maryborough. Despite the number of calls upon his time as a radiographer, he did not neglect the other departments of his profession. He had a wide practice as a general practitioner. On the outbreak of the present war Whittle offered his services, which were readily accepted, and he left with the rank of major for Egypt. As is well known, he was accidentally killed before he was able to do much of the work that was so dear to him.

Whittle's many friends fully expected that he would practise as a child specialist, but he showed a preference for radiography. His interest in children was to take an important turn, which benefited so many of the children of the "Never Never". His Excellency Sir Leslie Wilson, Governor of Queensland, suggested to Whittle and two of his friends that "Toc H" might work with the Country Women's Association in order to give a holiday at the seaside to those children who were living in the far west and who had never seen the sea. Whittle's enthusiasm was fired, and he immediately got into touch with the officers of the local branch of the Country Women's Association, ascertained the cost of accommodation for a child for six weeks' holiday at the Country Women's Association home, and then without a single penny being subscribed, issued invitations to twenty children to come to Pialba for six weeks' holiday. Such was the charm of his personality that the money poured in. This was the origin of the Western Children's Health Scheme. Whittle became the first chairman of the Maryborough branch and continued to hold this position until death. The activities of the scheme became eventually so large that it had to be made State-wide and the headquarters of the movement are now in Brisbane, but the credit of its founding must always be given to Whittle and the local branch of "Toc H".

Whittle had an unquenchable thirst for knowledge, which revealed itself in many ways. In his own profession he read extensively, but apart from his medical studies he was widely read. He had long made the study of Antarctic exploration a serious one, and so thorough had this study become that he could be regarded as an authority on this subject. There can be no doubt that the life of Scott and Dr. Wilson (Dr. Bill) influenced him profoundly.

His charm of manner, his winning personality, his modest demeanour and above all his sincerity had won for him legions of friends.

WILLIAM JAMES PENFOLD.

We regret to announce the death of Dr. William James Penfold, which occurred on October 26, 1941, at Camberwell, Victoria.

FRANCIS MICHAEL BLACKALL.

We regret to announce the death of Dr. Francis Michael Blackall, which occurred on October 28, 1941, at Randwick, New South Wales.

HERBERT ERNEST LEE.

We regret to announce the death of Dr. Herbert Ernest Lee, which occurred on November 1, 1941, at Burwood, New South Wales.

Nominations and Elections.

The undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Bligh, Richard Geoffrey, M.B., 1941 (Univ. Sydney), Royal North Shore Hospital, St. Leonards.

Bryson, Allan Muir, M.B., 1939 (Univ. Sydney), 33, Elizabeth Street, Ashfield.

Notice.

The Medical Secretary of the Victorian Branch of the British Medical Association writes that a copy of *The Lancet* of March 15, 1941, addressed to the Medical Society of Victoria, was apparently lost by enemy action, and advice has been received from the publishers that as the issue is now entirely out of print they cannot supply a duplicate copy. If any member in Australia received that issue, donation of his copy to the library of the Medical Society of Victoria would be very much appreciated.

The New South Wales Post-Graduate Committee in Medicine announces that the next library seminar arranged by the Post-Graduate Directors of Medicine, Surgery and Pathology will be held at the Prince Henry Hospital, Little Bay, New South Wales, on Monday, November 10, 1941, at 4.30 o'clock p.m. In these seminars, which are quite informal, special attention is given to recent literature, and it is the aim of the directors to encourage free discussion on the selected subjects. A cordial invitation to be present is extended to all medical practitioners.

Australian Medical Board Proceedings.

TASMANIA.

The undermentioned have been registered, pursuant to the provisions of the *Medical Act*, 1918, of Tasmania.

Knox, David Neilson, M.B., Ch.B., 1909 (Univ. Glasgow), Sorell.

Meagher, Kevin James, M.B., B.S., 1941 (Univ. Melbourne), Royal Hobart Hospital, Hobart.

Stewart, Alan Benjamin, M.B., Ch.B., 1920 (Univ. Leeds), Waratah.

Medical Appointments.

Dr. Raymond Tennyson Allan has been appointed a Member of the Indeterminate Sentences Board, pursuant to the provisions of the *Crimes Act*, 1928, of Victoria.

Dr. D'Arcy Nelson Short has been appointed Government Medical Officer at Blayney, New South Wales.

Dr. Gerald Barry Wilson has been appointed Government Medical Officer at Molong, New South Wales.

Dr. Harry Vivian Francis has been appointed a Commissioner of the Port Fairy Waterworks Trust, pursuant to the provisions of the Water Acts of Victoria.

Books Received.

"Our Opinions and the National Effort", by A. P. Elkin; 1941. Sydney: Australasian Medical Publishing Company, Limited. Demy 8vo, pp. 80. Price: 2s. 6d. net.

"Text-Book of Histology for Medical Students", by E. E. Hewer, D.Sc.; Second Edition; 1941. London: William Heinemann (Medical Books) Limited. Crown 4to, pp. 375, with illustrations and diagrams. Price: 17s. 6d. net.

Diary for the Month.

Nov. 11.—Tasmanian Branch, B.M.A.: Branch.
Nov. 14.—Queensland Branch, B.M.A.: Council.
Nov. 19.—Western Australian Branch, B.M.A.: Branch.
Nov. 26.—Victorian Branch, B.M.A.: Council.
Nov. 27.—New South Wales Branch, B.M.A.: Branch.
Nov. 27.—South Australian Branch, B.M.A.: Branch.
Nov. 28.—Queensland Branch, B.M.A.: Council.
Nov. 28.—Tasmanian Branch, B.M.A.: Council.
Nov. 28.—Tasmanian Branch, B.M.A.: Council.
Dec. 3.—Western Australian Branch, B.M.A.: Council.
Dec. 3.—Victorian Branch, B.M.A.: Branch.
Dec. 3.—Victorian Branch, B.M.A.: Council.
Dec. 4.—South Australian Branch, B.M.A.: Council.
Dec. 9.—Tasmanian Branch, B.M.A.: Branch.

Medical Appointments: Important Notice.

Medical practitioners are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia.

Editorial Notices.

Manuscripts forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to The Medical Journal of Australia alone, unless the contrary be stated.

All communications should be addressed to the Editor, The Medical Journal of Australia, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

Members and subscribers are requested to notify the Manager, The Medical Journal of Australia, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such a notification is received within one month.

Subscription Rates.—Medical students and others not receiving The Medical Journal of Australia in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rates are £2 for Australia and £2 5s. abroad *per annum* payable in advance.